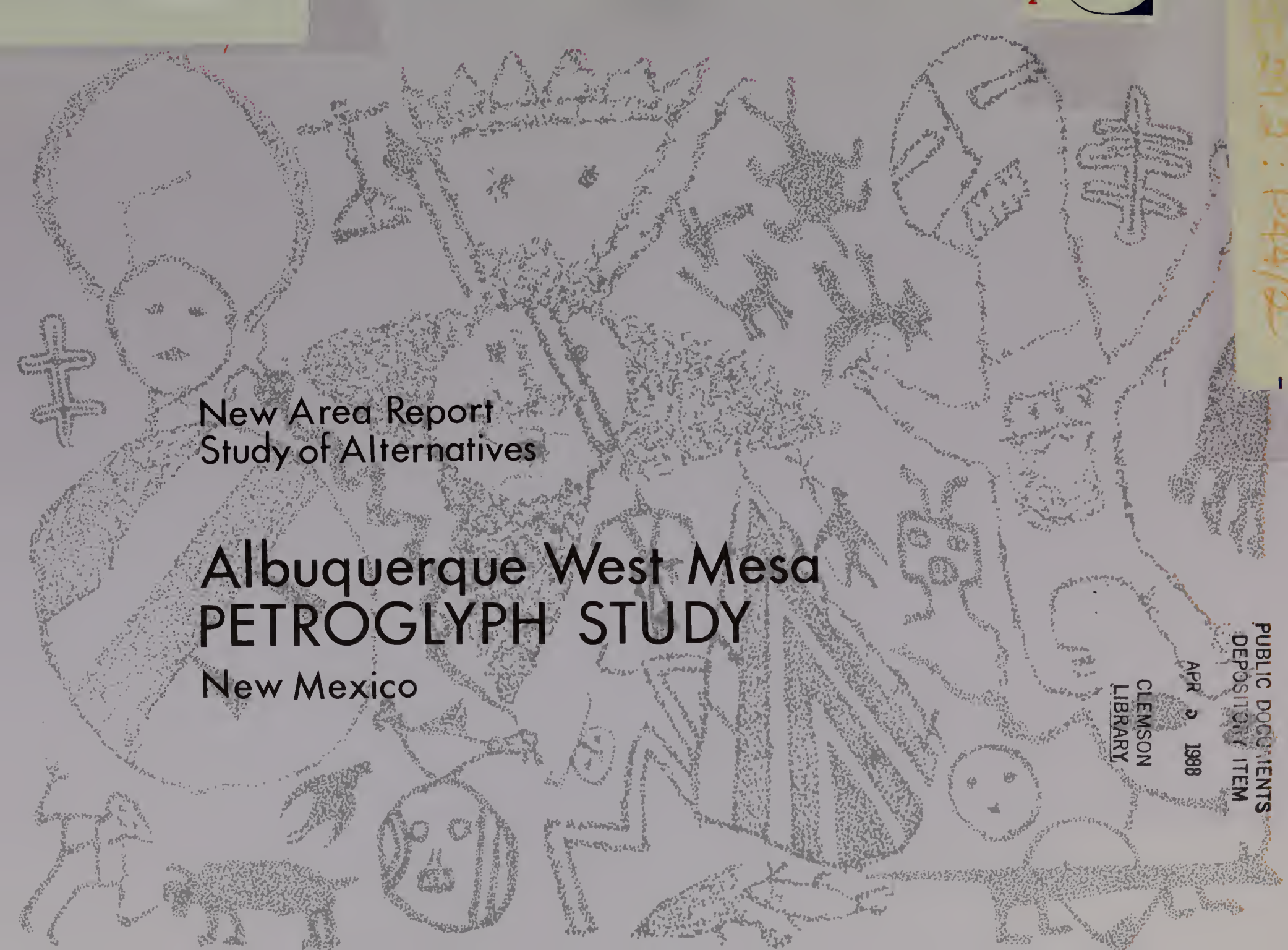

New Area Report
Study of Alternatives

Albuquerque West Mesa PETROGLYPH STUDY

New Mexico

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New Area Report
Study of Alternatives

ALBUQUERQUE WEST MESA PETROGLYPH STUDY FEBRUARY 1988

Southwest Regional Office
National Park Service
Santa Fe, New Mexico

A mixture of Hispanic and Indian petroglyphs. The Hispanic crosses may have been carved here to exorcise the powers of the Indian figures.

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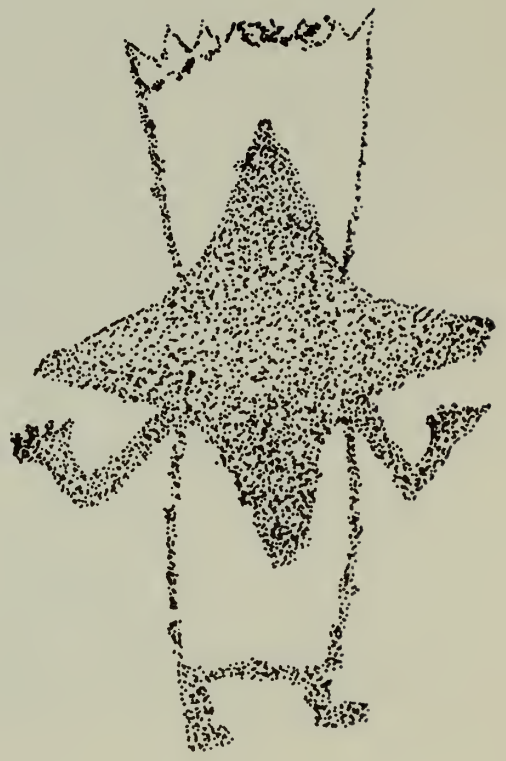
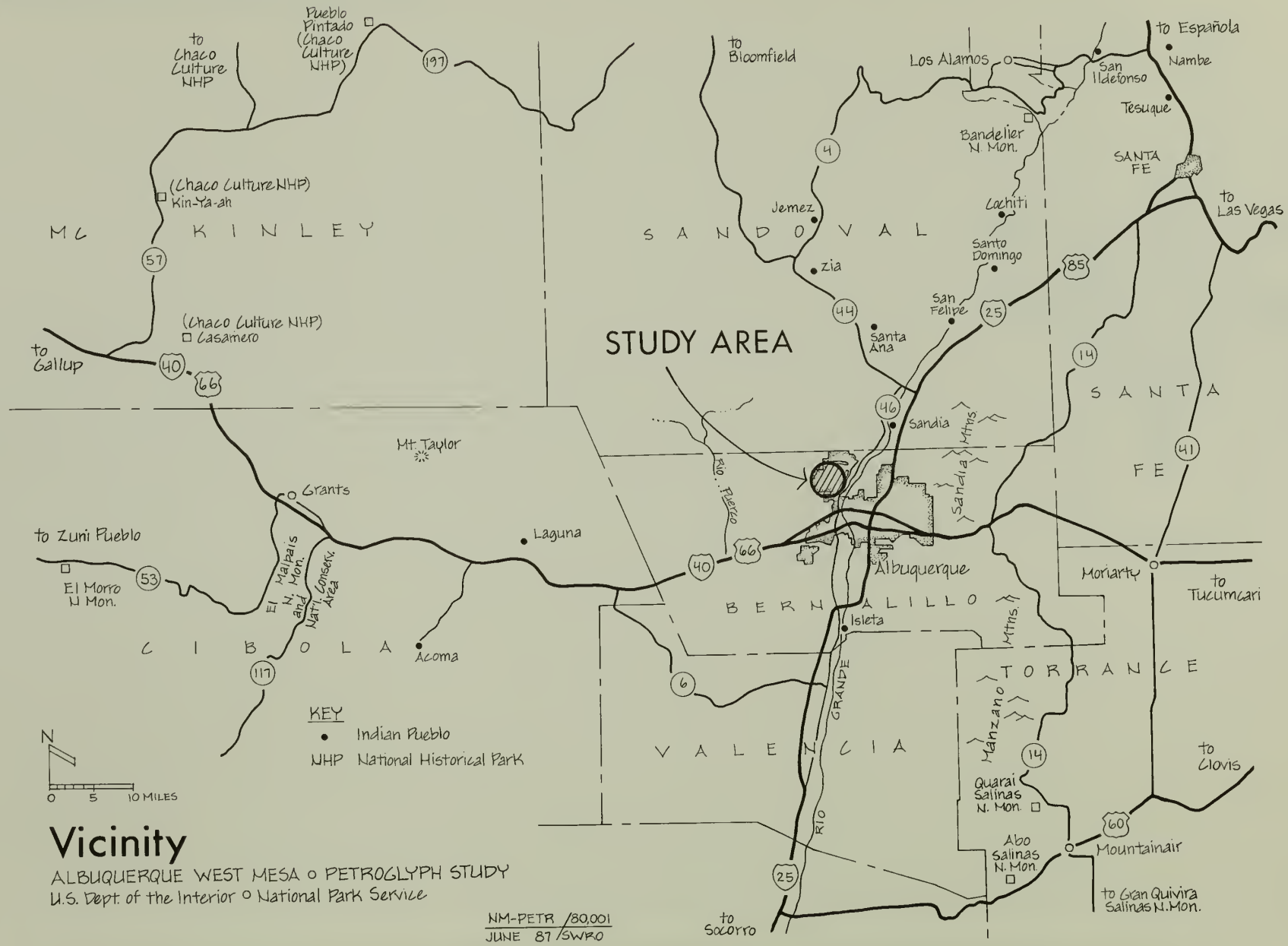
Photography courtesy of Ike Eastvold

Aerial view of Mesa Prieta with the five volcanoes in the distance. The large natural terraces highlighted along the escarpment were used by the Anasazi for camping and agriculture and by Hispanics for sheep corrals. Over 1700 prehistoric Indian and colonial Hispanic petroglyphs are found in the first two kilometers of the mesa escarpment, including some of the finest examples of Hispanic crosses and some of the oldest Indian petroglyphs.



introduction


to Chaco Culture NHP
Pueblo Pintado (Chaco Culture NHP)
197
(Chaco Culture NHP) Kin-Ya-ah
MC KINLEY
57
(Chaco Culture NHP) Casamero
to Gallup
40
66
Mt. Taylor
Grants
to Zuni Pueblo
El Morro N Mon.
53
El Malpais N. Mon. and Natl. Conserv. Area
Laguna
CIBOLA
Acoma
117
KEY
Indian Pueblo
NHP National Historical Park
N
0 5 10 MILES
Vicinity
ALBUQUERQUE WEST MESA o PETROGLYPH STUDY
U.S. Dept. of the Interior o National Park Service
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to Bloomfield
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4
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to Las Vegas
85
San Felipe
44
25
Santa Ana
STUDY AREA
14
SANTA FE
46
Sandia
Mtns.
41
Rio Puerco
Sandia
Albuquerque
Moriarty
to Tucumcari
40
66
BERNALILLO
Isleta
Mtns.
6
Rio Grande
TORRANCE
Manzano
14
to Clovis
Quarai Salinas N. Mon.
60
Abo Salinas N. Mon.
Mountainair
to Gran Quivira Salinas N. Mon.
25
to Socorro
VALENCIA

West of Albuquerque, New Mexico, the major landscape feature is the West Mesa, characterized by the dark, winding line of a 17-mile-long basalt escarpment and five volcanic cones. The West Mesa is known for the number, variety, and quality of its petroglyphs (designs carved or pecked into the rock). Most were created between A.D. 1300 and 1650, but some could be nearly 3000 years old. There are also numerous archeological sites representing at least 12,000 years of human history.

The city of Albuquerque is growing rapidly to the west, and although much of the mesa top has been acquired by the city for open space and recreation, large subdivisions have been approved up to the base of the escarpment and on the mesa top. In one area, lots have been platted over the cliff face. A number of homes have already been built at the base of the escarpment adjacent to major rock art concentrations, and construction is continuing at a rapid pace. Petroglyphs are continually lost or damaged by vandalism, shooting, attempts at theft, and construction activity.

Citizen groups, led by the Friends of the Albuquerque Petroglyphs, have organized a movement to protect the West Mesa and are supporting the concept of a national monument in the area. U.S. Senator Pete Domenici was instrumental in acquiring funds for the National Park Service through the 1987 congressional appropriation act to study the suitability of the area for national monument status and other protection options.

THE FEASIBILITY STUDY

The study has two major objectives: (1) to evaluate the significance of the cultural and natural values of the West Mesa according to National Park Service criteria and (2) to provide alternatives for the management of the area. The first of these objectives is covered in two sections of this document: "Study Area Characteristics" and "Analysis of Significance." The second objective is met in the "Alternatives for Management" section.

This document represents the efforts of archeologists, rock art specialists, geologists, planners, and others who have gathered information on a 12,700-acre West Mesa study area. It is also the result of extensive discussions among the members of a study team that includes representatives of the National Park Service, the state of New Mexico, and the city of Albuquerque.

Public involvement has included coordination and consultation with landowners, conservation organizations, and Pueblo Indian leaders. Public meetings were held in Albuquerque on December 15, 1986, and after publication of this document in draft form, on July 21 and 22, 1987. A total of approximately 230 people attended these meetings. Many written comments were received, and press and television coverage has been substantial.

CONTEXT OF THE STUDY AREA

Albuquerque is the major commercial and industrial center in New Mexico. With a population of 425,000 in 1985 it is also by far the largest city in the state both geographically and in terms of population. The city is situated in a large basin defined by the Sandia Mountains on the east and the West Mesa to the west. The Rio Grande flows from north to south through the

A one-of-a-kind abstract petroglyph design. The nested triangular shapes conform to the shape and contours of the rock. A fish, a comparatively rare design along the escarpment, swims under the triangles.

city. Presently Albuquerque's population is concentrated to the east of the Rio Grande.

Albuquerque's projected annual growth is estimated at 2.6 percent; population in the urban area is expected to increase more than 70 percent from 1980 to 2010. Slightly more than half of this population growth is expected to occur on the west side of the Rio Grande. A major new access bridge over the Rio Grande has recently been built, in conjunction with an east-west highway (Paseo del Norte) currently under construction. When this project is completed, the already substantial demand for land, urban facilities, and services such as roads, utilities, schools, and recreation will increase dramatically.

The city of Albuquerque's Northwest Area Plan - Volume I (May 1987) covers a planning area of approximately 207 square miles (132,550 acres) including the West Mesa and the study area (12,700 acres). The planning area stretches from the Rio Grande westward, across the mesa to the Rio Puerco, and from Interstate 40 northward to the Bernalillo County line. The population in the planning area was 24,000 in 1980 and was estimated to be 31,000 in 1985. Between 1985 and 1995, the population is expected to double to 62,000.

To the north of the Bernalillo County Line is Rio Rancho, the most rapidly growing community in New Mexico. This rapid growth to the north affects planning for the West Mesa area, especially planning for roads, highways, and utilities.

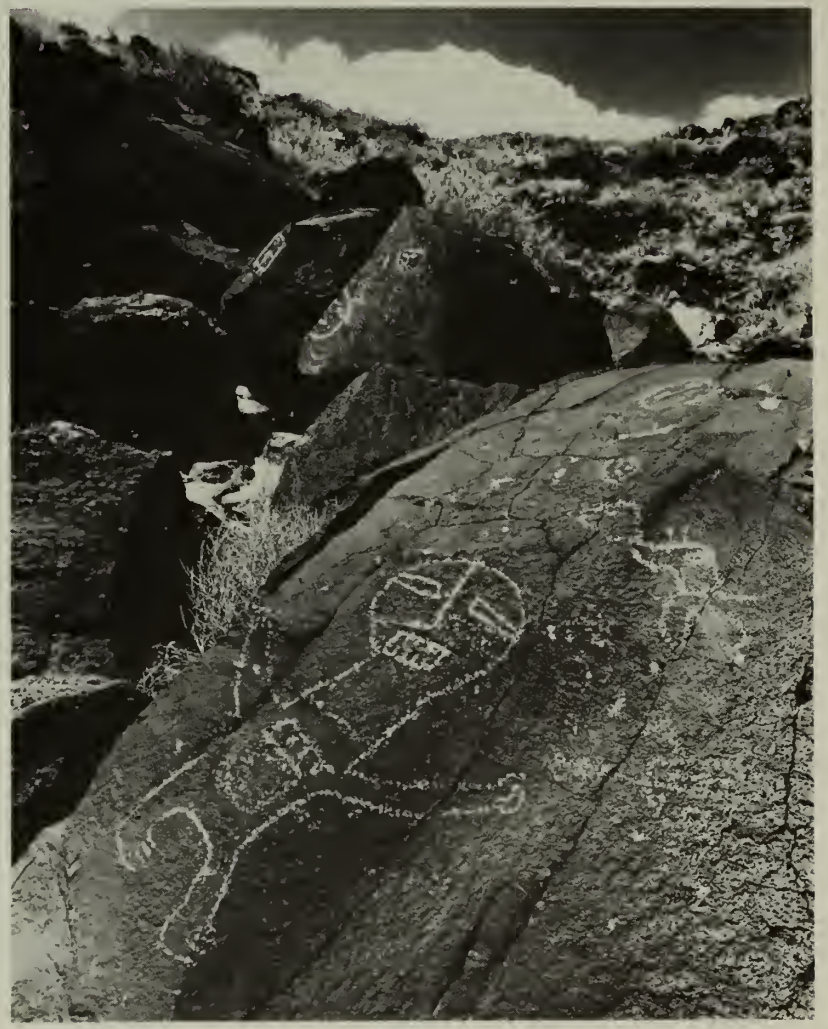
RECREATIONAL OVERVIEW

The following national parks and monuments are within 150 miles of Albuquerque: Bandelier National Monument, Chaco Culture National Historical Park, El Morro National Monument, Fort Union National Monument, Pecos National Monument, Salinas National Monument, and El Malpais National Monument and National Conservation Area. Parts of the Santa Fe Trail, authorized as a national historical trail by Congress in May 1987, will also be within a short drive of Albuquerque.

The El Malpais National Monument is adjacent to Interstate 40 about 80 miles west of Albuquerque. The legislation for the El Malpais National Monument included the establishment of the Masau Trail, a motor tour route of prehistoric Indian sites and other significant features in New Mexico and eastern Arizona. If a national monument is established on the West Mesa, it will be a major feature on the Masau Trail. Major attractions near Interstate 40 in Arizona include Petrified Forest National Park and Grand Canyon National Park, as well as the Navajo and Hopi Indian reservations.

Other New Mexico attractions in the vicinity of Albuquerque include state monuments, national forests, and Indian pueblos. The historic cities of Santa Fe (60 miles) and Taos (129 miles) are also popular with travelers from throughout the United States and abroad. Tourism is becoming increasingly important to the economy of New Mexico, and state government has committed substantial economic resources to promotion of recreational travel.

Within Albuquerque the major attractions for out-of-town visitors are Old Town, the original Spanish settlement founded in 1706; the Sandia Mountains, including hiking trails, a ski area, and a tramway; and the Indian Pueblo Cultural Center. Other attractions include museums, the University of New Mexico, the Rio Grande Zoo, the Rio Grande Nature Center, the Indian Petroglyph State Park, and numerous city parks and recreational facilities.



The "bear shaman" has a bear paw design in its abdominal area, claw-like feet and hands, large teeth, and a mask-like face.

study area characteristics

CULTURAL RESOURCES

Introduction

The most significant and visible resources in the study area are the estimated 15,000 to 17,000 petroglyphs found primarily along the escarpment, but also on the volcanoes and in the geological windows. Part of the significance of the petroglyphs is their relationship to the natural environment and to the other cultural resources of the area--the less visible archeological sites that have been discovered in and around the study area. These sites provide an important context for many of the petroglyphs as well as information essential to an understanding of the people who created the rock art. In the study area, sites from all major time periods over the past 12,000 years have been documented, with 65 archeological sites recorded for the escarpment alone. The richness and variety of the rock art and archeological sites along the escarpment led to the designation of the escarpment area as the Las Imagines National Archeological District, listed as nationally significant on the National Register of Historic Places.

Paleo-Indian Period (10,000-5500 B.C.)

On the West Mesa, the archeological record begins near the end of the Pleistocene, when animals now extinct, such as mammoths, perhaps mastodons, giant prehistoric forms of bison, and other large mammals roamed up and down the Rio Grande Valley. Following the herds of these large animals were small groups of hunters/gatherers and their families. These early inhabitants are referred to as Paleo-Indians.

The sites remaining from the Paleo-Indians are generally associated with the making of stone tools or the use of fire, and they contain chipped stone and/or burned or cracked rock. So far, most of the Paleo-Indian sites found in the vicinity of the West Mesa were west of the study area near the shorelines of what once were lakes. In the study area, sites have been discovered near the volcanoes, and it is possible that sites to the east of the volcanoes are still covered by soil and have not been identified.

Archaic Period (5500 B.C.-A.D. 400)

Gradually, as the glaciers of the Pleistocene disappeared, the climate became warmer and drier, and the number of large mammals dwindled. People became increasingly dependent on gathering wild plants, and they hunted a wider variety of smaller animals. Our knowledge of the Archaic Period has been gained mostly through the artifacts used for hunting and processing plant materials. Changes in the type and number of artifacts indicate changes in the way of life. For example, grinding slabs and cobble handstones in sites dating after 3200 B.C. indicate more and better use of grasses and other seeds.

Eventually, after 1800 B.C. a new land use pattern appeared with evidence of limited maize agriculture on the narrow floodplains near the heads of canyons. Although probably never a major part of the diet, maize made possible a temporary, seasonal surplus of food which could reduce the need for mobility and lead to a more settled existence.

The last part of the Archaic Period contains the earliest forms of Anasazi/Pueblo culture (Basketmaker Period), characterized by increasing population, decreasing group mobility, the first ceramics, and the first substantial dwellings, which were single-room, underground structures referred to as pithouses.

The study area contains few Archaic sites when compared with lands immediately to the west; however, it does contain one of the most important Archaic sites in the vicinity. This site is especially significant because it contained evidence for the transition between the Archaic cultures and those of the early Puebloan peoples who were beginning to rely on agriculture.

Rock Art. The oldest petroglyphs date from roughly 1000 B.C. to around A.D. 500 and are found on the northern part of the escarpment and on the volcanoes. They are curvilinear abstract patterns such as circles, meandering lines, and rakes.

Early Pueblo Periods I, II, III (A.D. 600–1300)

The early Pueblo periods (I, II, III) were marked by a gradual transition from pithouses to above-ground structures with numerous rooms. This change was accompanied by population increases and the growing importance of agriculture to the economy. Within the study area, only a few sites have been found from these time periods. No pithouses have been identified so far, but there is a good possibility that some will be found: Pithouses are usually buried and not visible during a ground-level survey, and excavations near Albuquerque outside the study area have uncovered numerous pithouses.

Rock Art. The limited amount of rock art from the early Pueblo periods consists of outlined crosses (Pueblo I), sandal tracks, handprints, stick-figure men, and small, solidly pecked animals including lizards and squirrels (Pueblo II and III).

Pueblo IV Period (A.D. 1300–1650)

During the Pueblo IV period, the prehistoric population reached a peak, occupying as many as 30–40 major pueblos built within a 250-year period. Many of these buildings contained hundreds of rooms and were two and three stories tall. Kivas (underground ceremonial chambers) were often decorated with spectacular wall paintings.

The Zuris-Mann Site. One of these major pueblos, the Zuris-Mann site, is considered part of the study area although it is slightly over one mile east of the escarpment and is not contiguous with the rest of the study area. Because the pueblo was built of adobe that has "melted" over time, the site appears as a series of mounds covered by saltbush and other vegetation. It contains, however, an estimated 1000 ground-floor rooms, and it is probable that second and third story rooms were present. There are also an unknown number of kivas and numerous pithouses. The site was inhabited for nearly 300 years and therefore represents a complex story of prehistoric life along the Middle Rio Grande. Despite its location in an urban area, the pueblo is approximately 80 percent intact. It may well be the last basically undisturbed Pueblo IV ruin in the Middle Rio Grande Valley.

Other Archeological Sites. Although people lived in the pueblos along the Rio Grande Valley, the mesa top and escarpment within the study area were essential for their well-being. The escarpment, in particular, was a center of intensive use. Below the millions of basalt boulders that form the visible escarpment is a layer of sandy sediments that catch and retain surface runoff from the mesa above. The result is a uniquely rich habitat for animals as well as wild and cultivated plants necessary to sustain the comparatively large populations of the pueblos. The archeological sites found in the

study area include agricultural fields and terraces, fieldhouses, and water control features, as well as shrines and thousands of petroglyphs.

The fields and terraces were formed by low basalt barriers designed to stabilize and accumulate soil and retain moisture. Low rock walls along the top edge of the escarpment appear to have controlled run-off from the escarpment. Fieldhouses are small stone structures generally found in association with agricultural areas. Shrines containing cairns of basalt boulders and other evidence of religious use, are found on top of the escarpment. The cairns are often associated with semicircular or circular low stone walls or rings. Some are prehistoric, while others are historic or of recent construction. There is evidence that the volcanoes were also the location of past and current Pueblo religious uses.

Rock Art. An estimated 70-95 percent of the petroglyphs in the study area date from the Pueblo IV period. They include lizards or horned toads, large animals and birds in outline, human ceremonial figures, star beings, fluteplayers, horned and masked serpents, and kachina masks. These figures are numerous, bold, and frequently complex.

The Pueblo IV rock art of the study area is classified as Rio Grande Style, one of the most dramatic styles of rock art in content, style of execution, and complexity in the Southwest. It represents a break in style and content with the rock art that preceded it and relates to contemporary Pueblo religious images. The Rio Grande Style is limited in its distribution, being found only along the Middle Rio Grande and in the Galisteo Basin of New Mexico. Because of recent population growth and consequent development, many important sites of Rio Grande Style petroglyphs have been lost.

The petroglyphs are important as a whole in their original physical setting . It is important to protect the integrity of the petroglyphs for future research and study. To move or destroy the rock art and the physical setting would greatly reduce the quality of the resources.

Historic Period

The Historic Period begins with the explorations of Vasquez de Coronado between 1540 and 1542. Documents from the expedition identify between 12 and 16 pueblo communities in the area referred to as the Tiquex or Southern Tiwa Provinces. Several of the pueblos were destroyed by the Spanish, and the people dispersed.

In the latter half of the sixteenth century, the Pueblo people returned. Spanish settlers began to arrive in 1598, and eventually missions were established. Between 1610 and 1680, the Pueblo population was severely reduced by crop failures, disease, raids by the Apaches and Navajo, and economic exploitation by the Spanish.

Between the Pueblo Revolt of 1680 and the Spanish Reconquest of 1692 and for many years following, the vicinity of the study area was little used. Major Hispanic settlement along the Rio Grande began about 1706. The primary economic activities were agriculture and animal husbandry. These land uses persisted into the twentieth century. Albuquerque is now the major industrial and commercial center for New Mexico. Two of the original Tiquex pueblos were reoccupied: Isleta (1709) and Sandia (1748).

Archeological sites indicate that the study area was

The "shrine of the star beings" is on a cliff edge above a large residential subdivision. On the right is a dragonfly resembling a telephone pole on its side and a possible Shalako figure with characteristic triangular torso.

extensively used for grazing and seasonal herding camps during the historic period. Sheepherding sites include remains of corrals, smaller structures assumed to be lambing pens, and artifacts from campsites. Ranching sites, associated with cattle raising, have larger, more permanent corrals than the sheepherding sites.

Rock Art. Petroglyphs from the historic period include Christian crosses pecked by Hispanic sheepherders. Some of the crosses are repeatedly associated with specific earlier figures such as serpents and mountain lions, as if to nullify their power. Other recent petroglyphs include initials and animal brands, which are attributed to both Hispanics and Anglos.

Further Information

Further information on the cultural resources of Albuquerque's West Mesa can be found in the following National Park Service studies, available on request from the Division of Planning and Design, Southwest Regional Office, National Park Service, P.O. Box 728, Santa Fe, New Mexico 87504-0728:

"The Cultural Resources of the West Mesa Petroglyph Study Area and Immediate Environs" by Arthur K. Ireland.

"The Archeology of the West Mesa Area: A Summary" by Matthew F. Schmader.

"Rock Art and Associated Archeological Sites of the Las Imagines Archeological District, West Mesa, Albuquerque: Statement of Significance" by Polly Schaafsma.

See also the list of references included in this document.

One of Rinconada Canyon's spectacular serpent beings, masked with cloud-column horns or feathers. Notice the rattles on the tail.

Geology

A series of volcanic eruptions 190,000 years ago along a five-mile-long fissure in the earth resulted in the lava rock that forms the present-day West Mesa. The earlier flows, the hottest and most fluid, flowed eastward in broad, relatively thin sheets that may have reached the river (but since have eroded back to the west to form the escarpment face). Later flows were cooler and more viscous, each one covering less area. The last eruptions were small and partly explosive eruptions from central vents that built up the five steep cones in a line along the original fissure.

The Albuquerque flows are ordinary basalt in composition and contain many features common to volcanic rocks of this type. This includes reddish "baked zones" where the hot lava oxidized iron in the underlying sediments; sharp contacts between upper and lower surfaces of successive flows; cooling fractures (contraction joints) that form the vertical columns seen along eroded edges of the flows; and evidence of horizontal tubes, or lava caves, in the flows.

In three places--Mesa Prieta, Rinconada, and Marsh Peninsula--narrow promontories of lava rock jut out from the escarpment. These reveal where lava followed ancient streambeds and was therefore locally thicker and more resistant to erosion than the surrounding materials.

The basalt rimrock and the scattered angular blocks below are coated with black "desert varnish." This thin layer of iron and manganese oxide, formed by weathering processes common in the arid Southwest, was a type of surface frequently used by prehistoric artists to carve their petroglyphs.

In the middle of West Mesa, there are three geologic "windows". These apparently formed when hills of soft sedimentary rock surrounded by lava flows eroded away, leaving "holes" in the terrain.

Of the five steep volcanic cones on the mesa top, the three southern cones--JA, Black and Vulcan--are the highest and illustrate clearly the characteristics of the final eruptions. In most cases the cinder eruptions alternated with viscous lava flows, thus the sides of JA and Vulcan are composed in some places of crumbly cinder and in others of dense lava. The most interesting volcano is JA, which contains not only the most diverse and colorful mixtures of lava, spatter, and cinder, but also shows how these materials interacted to build up the cone. In addition to a small lava cave, JA cone has "dribblet flows" that resemble candlewax in form and behavior, and a tongue-shaped lava flow that formed when the lava in the crater broke through the rim.

Soils

Soil has formed on West Mesa as the rocks have slowly weathered. The common parent materials are basalt and fine alluvial silt and sand. Sand is common in this environment and, if not part of the parent rock, is soon added by the wind. On the mesa top, soil varies in depth from 0 on the escarpment rim and volcanic cones to more than 5 feet in broad areas of little slope.

Mesa top soils impose certain constraints on development. Vertical joints along the rim of the escarpment are planes of weakness, and as the soft sediments below the basalt are weakened by water

passing down the joints, blocks of rock detach and roll down the slope. Care should be taken in the use of explosives and in trenching for utility lines to avoid channeling surface water into the joints. Back from the rim where the soil is deep enough to bury utility lines without disturbing bedrock, development would have less impact and would be less costly. An additional problem is low soil density and therefore low bearing strength. Another constraint is susceptibility to wind erosion. Piping (formation of horizontal conduits below the surface) could be a problem if soils are locally saturated for extended periods.

Below the mesa, especially along the northern and central parts of the escarpment, the soil is fine silt and sand requiring construction techniques such as precompaction and as little cut-and-fill as possible. Beyond the south end of the escarpment the soil has similar constraints, but because it is coarser sediment--sand and gravel in addition to silt--it has greater bearing strength. Trails on sandy flats and on the steep sand-and-boulder slopes below the rim should be aligned and constructed with special care.

Hydrology

Several arroyos and their branches drain West Mesa, and erosion is an active natural process. Some of the arroyos originate west of the study area, and major drainages extend to the east of the escarpment. Drainage patterns will change as lands surrounding the study area develop. Although the soils are porous and can absorb considerable surface water, heavy rainfalls could flood the arroyos and damage not only development but also natural and cultural resources if adequate drainage structures are not built into the community utility network. Any future drainage plans for the mesa should be comprehensive and address both the possible damaging effects of flooding and the need to retain, as much as possible, the natural qualities of streamflow in open space and park lands.

Vegetation

West Mesa is near the northern limit of the upper Chihuahuan Desert. The natural plant community that would be expected on top of West Mesa is generally a galleta-blackgrama grassland, with saltbush, winterfat, and apache plume the dominant shrubs. Because of heavy grazing and other human disturbance, however, sand dropseed and broom snakeweed are more common.

Under normal conditions the sandy flats extending out from the escarpment are a mixed shrub grassland with Indian ricegrass and sand sagebrush the dominant species. Grazing and other human activities have reduced the grass and increased certain shrubs such as sand sagebrush, rabbitbrush, broom snakeweed, and Russian thistle.

The only area beyond the base of the escarpment that is close to an undisturbed vegetative condition is at Piedras Marcadas. The escarpment with its steep, bouldery slopes is also a mixed shrub grassland. Because some of the rockier, less accessible areas have been little disturbed by recent grazing, they are close to natural conditions, with blackgrama and bush muhly the dominant grasses and four-wing saltbush the dominant shrub.

Wildlife

West Mesa animals are typical of the upper Chihuahuan

SOURCE: VOLCANOES AND RELATED BASALTS OF ALBUQUERQUE BASIN, NEW MEXICO, BY V. C. KELLEY AND A. M. KUDO, 1978, CIRCULAR 156, NEW MEXICO BUREAU OF MINES AND MINERAL RESOURCES

N

0 2000 4000 FEET

Legend

SF	Santa Fe Group and Younger Alluvium
1–6	Lava Flows (in sequence of eruption, with flow 1 first)
☼	Crater
*	Zuni's–Mann Site

Geology

ALBUQUERQUE WEST MESA • PETROGLYPH STUDY

U. S. Dept. of the Interior • National Park Service

NM-PETR/80,002

JUNE 87/SWRO

SOURCE VOLCANOES AND RELATED BASALTS OF ALBUQUERQUE BASIN, NEW MEXICO, BY V. C. KELLEY AND A. M. KUDO, 1978, CIRCULAR 156, NEW MEXICO BUREAU OF MINES AND MINERAL RESOURCES

Legend

- SF — Santa Fe Group and Younger Alluvium
- 1–6 — Lava Flows (in sequence of eruption, with flow 1 first)
- ☼ — Crater
- * — Zuni–Mann Site

Geology

ALBUQUERQUE WEST MESA ○ PETROGLYPH STUDY

U.S. Dept. of the Interior ○ National Park Service

NM-PETR/80.002

JUNE 87/SWRO

Desert, and most are ordinary species. Some animals are year-around residents; others, especially birds, may be present only during the migration or breeding season. The populations of some animals, particularly mammals such as ringtail and deer, are declining as human activity increases. The seeming absence of wild animals at West Mesa, except for birds and insects, is misleading. In fact, most mammals and reptiles and some invertebrates are nocturnal and are not apt to be seen by daytime visitors.

The escarpment has special ecologic significance. This long narrow zone consisting of the cliff, slope, and sandy flats below is an "ecotone" with varied plant life where many animals find shelter for concealment and nesting and/or have the best opportunity for preying on other species. Residential development is increasingly disturbing this zone.

Mammalian carnivores include the wide-ranging coyote and bobcat. Gray fox, desert kit fox, and long-tailed weasel are common along the rocky base of the escarpment slopes and in the sandy flats beyond. Rodents are numerous in all the West Mesa habitats. Common species include the whitethroat woodrat, rock squirrel, road pocket mouse, kangaroo rat, antelope ground squirrel, and white-footed mouse. Black-tailed jackrabbits and desert cottontail live in open areas above and below the escarpment; and bats, such as western pipistrell, roost in rock cavities along the escarpment.

The bullsnake, western coachwhip, and prairie rattlesnake are common in open areas. Common lizards include the whiptail, prairie, lesser earless, leopard, and the round-tailed horned lizard. Resident birds include scaled quail, horned lark, meadowlark, road runner, rock wren, great horned owl, burrowing owl, red-tailed hawk, and marsh hawk.

Insects--highly specialized and often wide-ranging animals--are very numerous. Other invertebrates include several species of spiders, sun spiders (solpugids), and scorpions, as well as a thriving population of the common desert millipede.

Further Information

Further information on the natural resources of Albuquerque's West Mesa can be found in the following National Park Service study, available on request from the Division of Planning and Design, Southwest Regional Office, National Park Service, P.O. Box 728, Santa Fe, New Mexico 87504-0728:

> "Natural Resources of the West Mesa Petroglyphs Study Area" by Allen R. Hagood.

SCENIC QUALITY

The mesa top offers panoramic views of Albuquerque and its natural environment. The Sandia and Manzano Mountains to the east and the cottonwood forest lining the Rio Grande as it flows through the city are dramatic natural landscape features, creating not only visual interest but also opportunities for interpretation of the geology and the history of settlement in the area. From the escarpment to the west, the mesa sweeps upward to the volcanic cones. This view also has potential for interpretation of the area's geology. West of the volcanoes, the landscape opens outward to the valley of the Rio Puerco, with Mt. Taylor north of Grants, New Mexico, visible in the distance.

From the base of the escarpment to the east, the views are generally similar to those from the mesa top. Views

to the west from the base of the escarpment are generally blocked by the escarpment face; however, the southern volcanoes present a dramatic view from the mouth of the Rinconada. In contrast, a sense of isolation and enclosure is experienced within the walls of the Rinconada and Piedras Marcadas Canyon as well as from the base of Mesa Prieta, where small, grass-covered ridges block the view to the city.

Another aspect of the visual quality of the area is the importance of the mesa, escarpment, and volcanoes as part of the view from Albuquerque. Protecting the views from the city of these major westside landscape features has long been a significant issue in Albuquerque city planning and open space preservation. Past planning for open space has preserved the foothills of the Sandia Mountains and much of the cottonwood forest along the Rio Grande. The West Mesa, as Albuquerque's third major landscape feature, is now the focus of preservation efforts. The scenic quality both from the study area and from Albuquerque to the mesa will be directly affected by developments interrupting the continuity of the line of the escarpment and by developments on the mesa top.

LANDOWNERSHIP AND USE

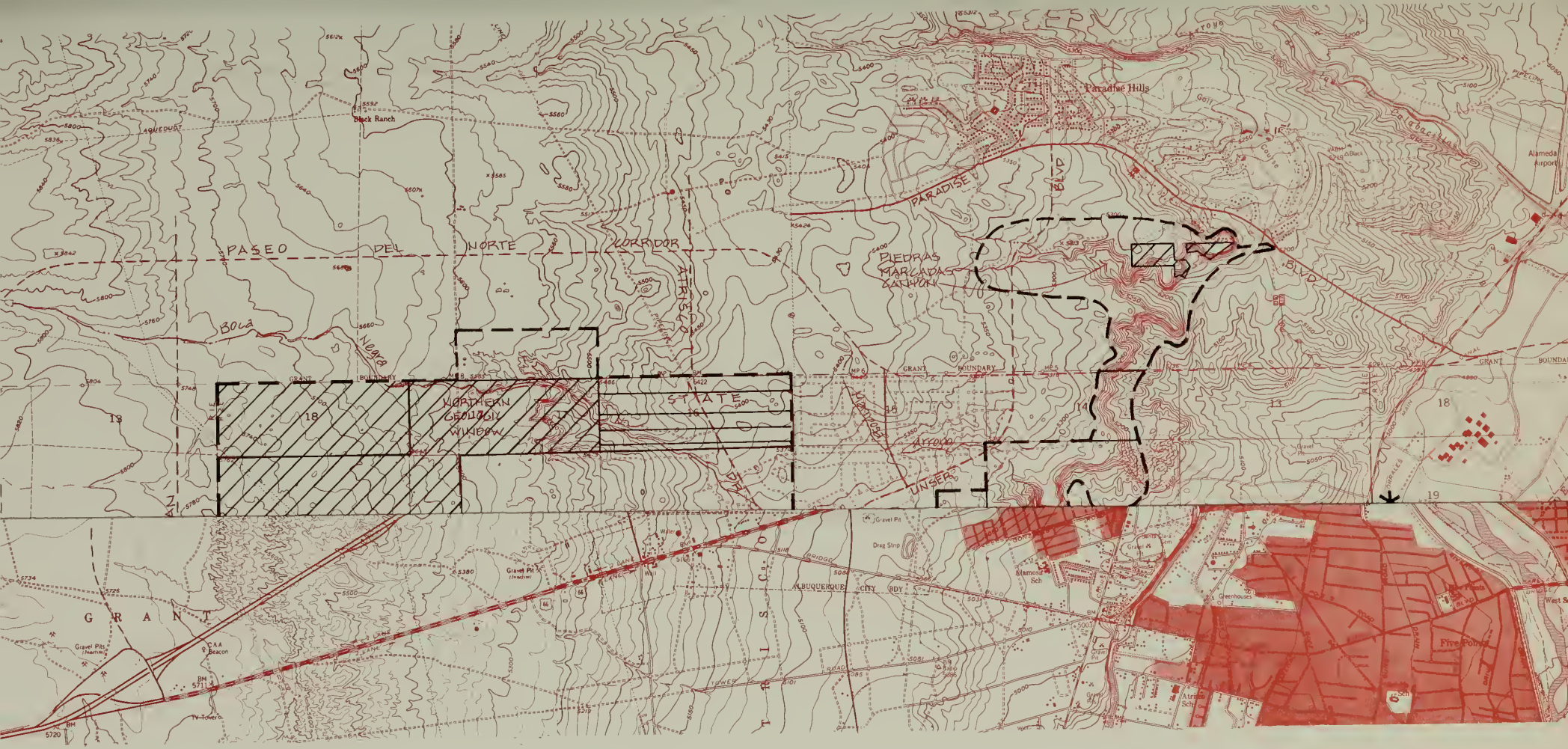
The land within the study area south of a line running through the middle of the Rinconada remains undeveloped. Nearly all of this land is in one ownership. Preliminary planning for commercial and residential development has begun, but the area has not as yet been zoned for urban uses. On the mesa top, Boca Negra and Volcano parks are owned by the city of Albuquerque with the exception of a section owned by the state. Boca Negra Park includes facilities for horseback riders, a model airplane field, and a motorcross course. Volcano Park remains essentially undeveloped, except for numerous dirt roads and tracks. Past mining for cinders has removed a volcanic cone and created a large pit on the flank of Vulcan, and cinder mining still occurs outside the north boundary of the study area.

At the base of the escarpment most of the land from the Rinconada north to Piedras Marcadas except Indian Petroglyph State Park has been zoned and platted for urban uses. Large subdivisions of single-family residences have already been developed adjacent to the escarpment and others are under construction. In some areas, lots have been graded into the base of the escarpment.

Lands on the mesa top between Boca Negra Park and the escarpment; north of Boca Negra Park; and to the north, south and east of Indian Petroglyphs State Park are in Volcano Cliffs, a subdivision for single-family residences platted in 1965. The subdivision contains 3800 individual lots. Approximately 200 of these lots border the top edge of the escarpment and 35 lots border the bottom edge. In portions of the subdivision, lots are platted over the face of the escarpment. City roads and utilities have not been extended to these properties, and the difficulty of building on the escarpment and of installing private water or sewer systems has discouraged development.

Indian Petroglyph State Park was established in the early 1970s to preserve petroglyphs and provide for public access. Land was acquired through dedication to the city of Albuquerque by private developers. Facilities were provided by the state. The state park is managed by the city of Albuquerque.

The city of Albuquerque has acquired some of the lands at Piedras Marcadas. Most of the land, however, is



Legend

- City
- State of New Mexico
- Private
- Zuris–Mann Site
- Study Boundary

Study Boundary and Landownership

ALBUQUERQUE WEST MESA ○ PETROGLYPH STUDY
U.S. Dept. of the Interior ○ National Park Service

NM-PETR/80,003
JUNE 87/SWRO

Legend

- City
- State of New Mexico
- Private
- * Zuris–Mann Site
- Study Boundary

Study Boundary and Landownership

ALBUQUERQUE WEST MESA ◦ PETROGLYPH STUDY

U.S. Dept. of the Interior ◦ National Park Service

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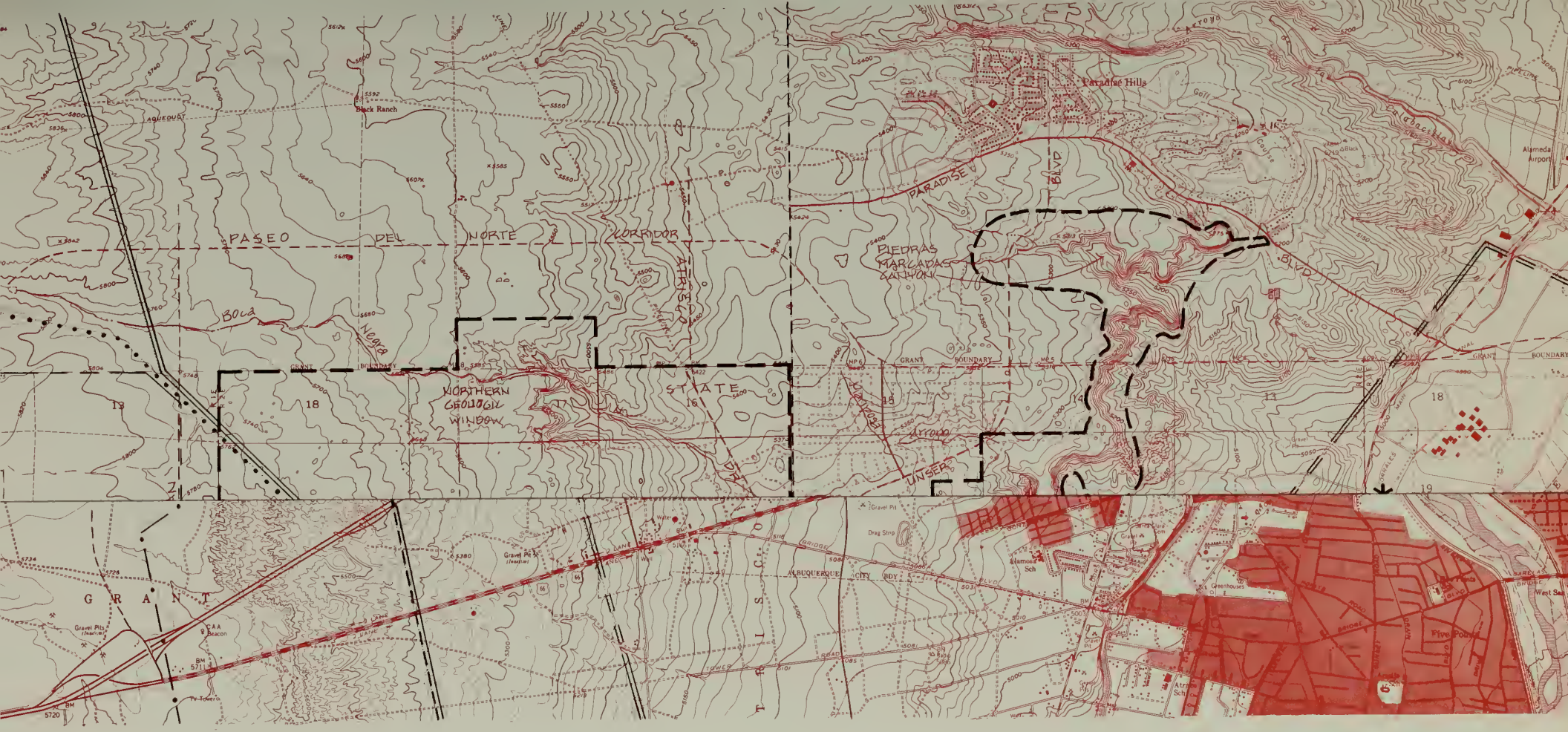

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Legend

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Plains Electric Coop		— — — —	
El Paso Electric	·—·—·		

— — Study Boundary

* Zuris-Mann Site

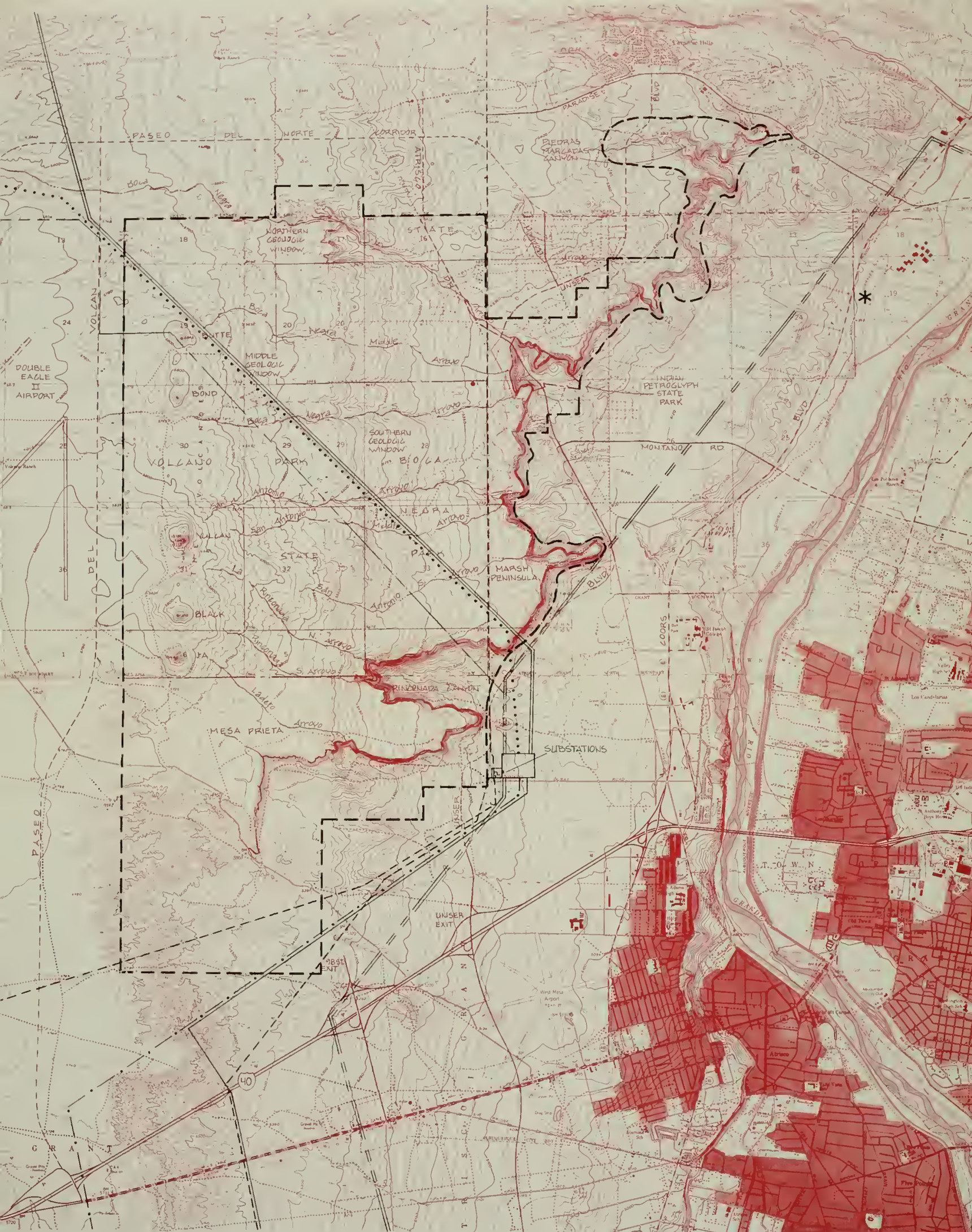
Major Transmission Lines

ALBUQUERQUE WEST MESA ○ PETROGLYPH STUDY

U.S. Dept. of the Interior ○ National Park Service

NM-PETR/80,008

SEPT. 87/SWRO



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Legend

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PNM	———	— — —	·····
Plains Electric Coop		— — — —	
El Paso Electric	·—·—·		

——— Study Boundary

* Zuris-Mann Site

Major Transmission Lines

ALBUQUERQUE WEST MESA ○ PETROGLYPH STUDY

U.S. Dept. of the Interior ○ National Park Service

NM-PETR/80008

SEPT. 87/SWRO

owned by various private owners. Parcels range in size from approximately 2.5 acres to over 50 acres. These lands have not been developed as yet. More than half of the Northern Geological Window is within Volcano Park; the remainder of this important feature extends onto privately owned lands.

Several major power transmission lines cross the proposed study area, and a major switching station is on the southeastern edge. These facilities are essential components of Albuquerque's power supply, and future planning in the area will involve coordination with the utility companies.

LAND USE PLANNING

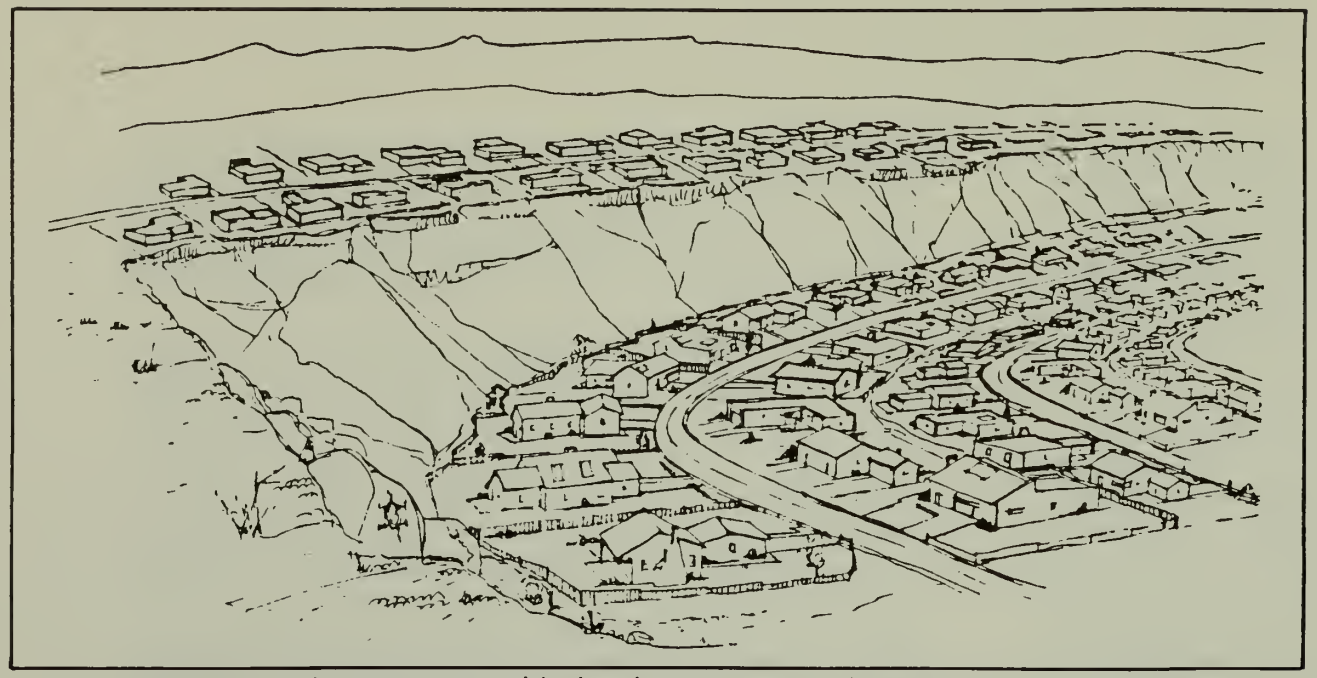
Past planning for the West Mesa by the city of Albuquerque has proposed preservation and protection of the escarpment, a strip of land along the upper edge of the escarpment, and lands at the base of the escarpment within slopes of 9 percent or more. The emphasis has been on preserving scenic values and cultural resources, as well as providing recreation. Most of the area to be protected is proposed for open space, with developed park areas at Piedras Marcadas and the Rinconada. Proposed techniques for protection include acquisition of private lands by the city through fee purchase, transfer of development rights, and dedication of open space by developers of large subdivisions. Design controls would preserve scenic qualities in areas designated for development adjacent to open areas. Also, a continuous pedestrian trail has been recommended from Piedras Marcadas to the Rinconada.

The Master Plan for Volcano Park, prepared by the Open Space Task Force/ West Mesa Committee in 1980, provides for open space and for five "intensive use areas" centering on the volcanoes and the southern and northern geologic windows. Proposed facilities include improved roads, parking areas, picnic areas, equestrian trails, highways, jogging trails, and interpretive exhibits and signs. Vulcan would be the most intensively developed, with an information center and an amphitheater in addition to the facilities listed above.

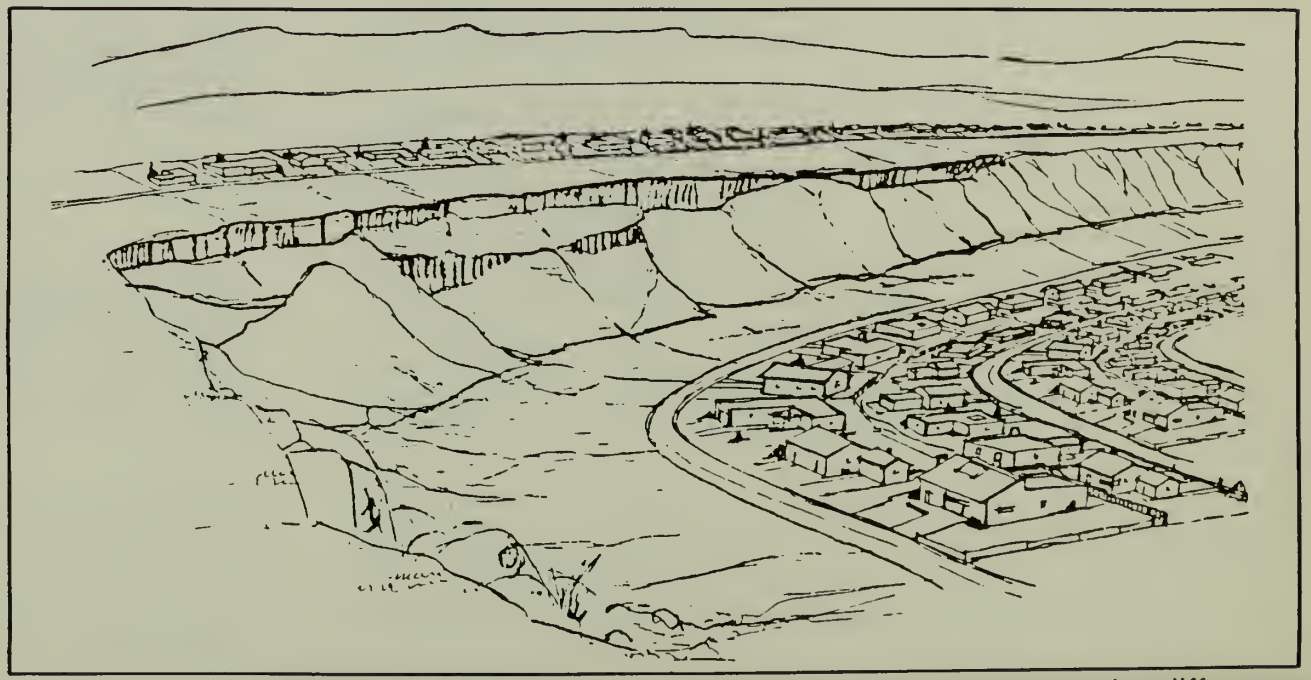
Other city plans propose development of the arroyos crossing the mesa from west to east to control drainage and provide recreation while linking the mesa with parks, archeological sites, and other features to the east. There are also plans for transportation and utilities as well as detailed development plans (sector and site plans) for areas along the base of the escarpment. The city's Archeological Resources Planning Advisory Committee has recommended establishing a public archeology program and has developed guidelines for research, assessment of resources, and public education.

Past plans affecting the study area are now being updated, and a number of new planning efforts are now in progress. Of special importance are the revision of the Northwest Mesa Area Plan (presently underway) and the Northwest Mesa Escarpment Plan, passed by the Albuquerque City Council on November 30, 1987. The escarpment plan defines the city's objectives regarding the escarpment, identifies areas to be acquired as open space, sets priorities for acquisition, and specifies standards for land development and design. It discusses the potential for federal involvement in preservation and management of the escarpment and mesa top. A list of existing plans in progress is in Appendix B.

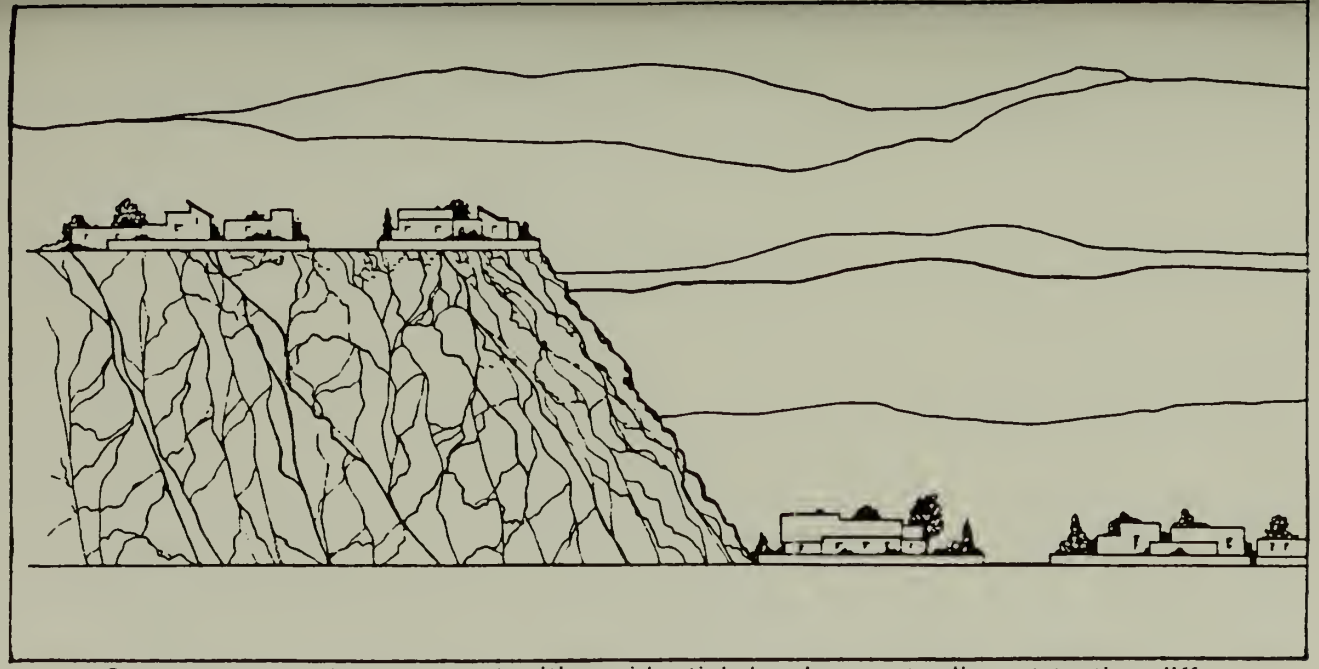
In October 1987, a 1/4 cent sales tax was passed by the Albuquerque City Council. Of these revenues, 13.8 million dollars was designated for city acquisition of lands along the West Mesa escarpment, in fiscal years 1988–1989. An additional 27 million dollars was earmarked for open space acquisition city-wide in fiscal years 1990–1993.



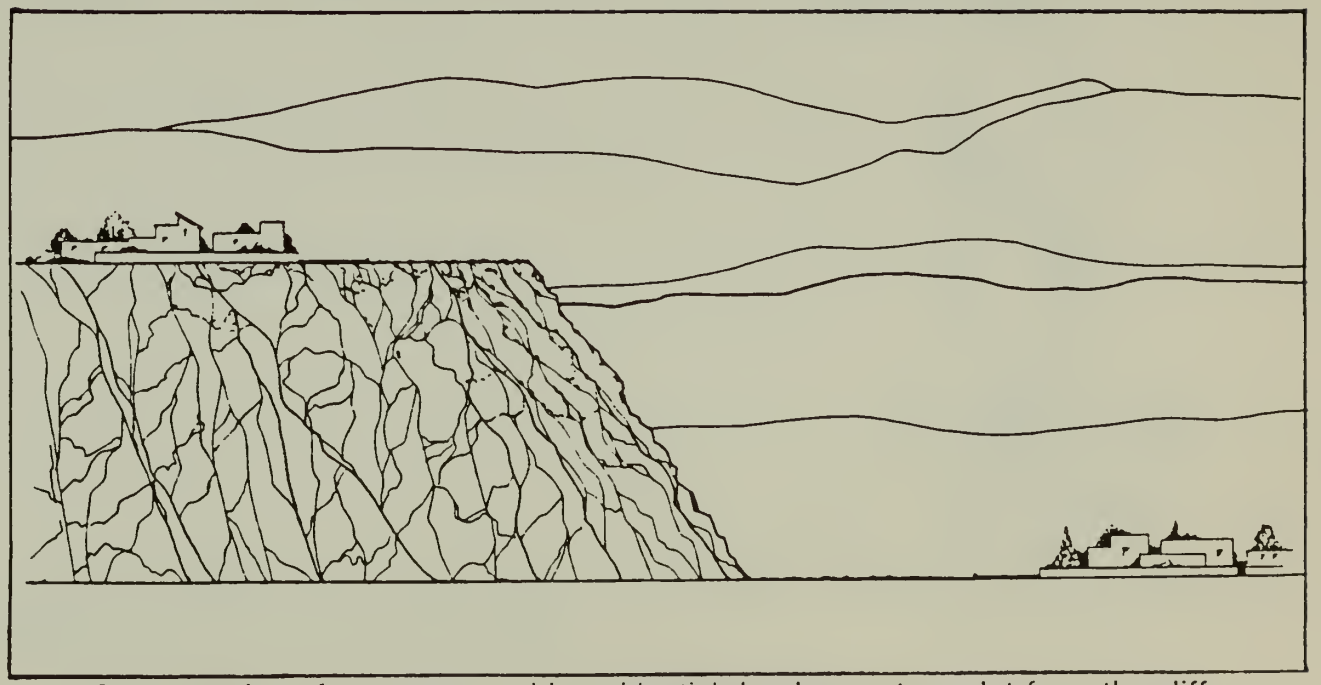
Perspective of escarpment with development at the base and top of the cliff



Perspective of escarpment without development on the lots adjacent to the cliff



Cross-section of escarpment with residential development adjacent to the cliff



Cross-section of escarpment with residential development one lot from the cliff

analysis of significance

CULTURAL RESOURCES

The Albuquerque West Mesa, and associated volcanic escarpment, comprises thousands of petroglyphs, prehistoric and historic archeological sites, and the important physical setting for these resources. The 17-mile stretch of the escarpment that is in the study area has been recognized as significant by placement on the National Register of Historic Places as the Las Imagines Archeological District. At the time of nomination to the National Register, the Las Imagines district was known to have over 10,000 documented petroglyphs. Subsuquent research has revealed that there are 15,000-17,000 petroglyphs along the escarpment, within the volcanic windows, and on the volcanoes. Over 60 archeological sites and shrines have been identified, with the probability of many more that have not been discovered because they are covered with wind-blown material. Also, the study area includes sites that are actively used by Native Americans for religious purposes.

Within the National Park System, national significance is ascribed to structures, sites, objects, and districts that possess exceptional values or quality in illustrating or interpreting the cultural heritage of our nation. An essential quality for an archeological district is integrity, a quality derived from original workmanship, original location, and elements of feeling and association.

The integrity of the West Mesa has been compromised to some extent: In the middle section of the escarpment, residential subdivisions have been developed along the base of the escarpment; a number of dirt roads and several high voltage powerlines cross the mesa top; and the volcanoes have been damaged by cinder mining. However, the sweep of the volcanic landscape and the primary landscape features as well as the archeological sites and the petroglyphs themselves still form an integral whole worthy of preservation.

Identification of cultural sites for the National Park System is guided by the thematic framework included in History and Prehistory in the National Park System and the National Historic Landmarks Program. This framework indicates how well prehistoric and historic themes are represented within the National Park System. The West Mesa resources are addressed in the National Park System plan by Theme 1. The Original Inhabitants: A. The Earliest Americans, B. Native Villages and Communities, C. Indian Meets European, D. Contemporary Native Cultures, and F. Aboriginal Technology. The petroglyph rock art is primarily addressed in 1F. Aboriginal Technology (4) Arts and Ceremonialism. The Spanish period petroglyphs and archeological sites are covered by Theme 2. European Exploration and Settlement: A. Spanish Exploration and Settlement through 1898. While subthemes 1 A-D have reasonable representation within the system with areas like Chaco Culture National Historical Park, Bandelier National Monument, Pecos National Monument, Wupatki National Monument and many others, subtheme 1 F(4) Arts and Ceremonialism is not well represented. Subtheme 1F(4) is represented in only a few units like Effigy Mounds National Monument.

The National Park System contains several areas that contain concentrations of petroglyphs; however, there is no unit of the system that is specifically established to commemorate and interpret rock art. The Albuquerque West Mesa area could serve as a focal point for rock art study and interpretation. At most other National Park Service facilities that focus on archeology, the visitor is presented with material remains that reflect the pragmatics of daily life--architecture, pottery, stone tools, food remains, and so forth. The West Mesa site offers the opportunity to present to the public concepts and metaphors that integrated daily life and provided a meaningful relationship with the environment.

The Las Imagines rock art is one of a number of major

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Legend

——— Las Imagines Archeological District

* Zuris—Mann Site on the National Register, but not part of Las Imagines Archeological District

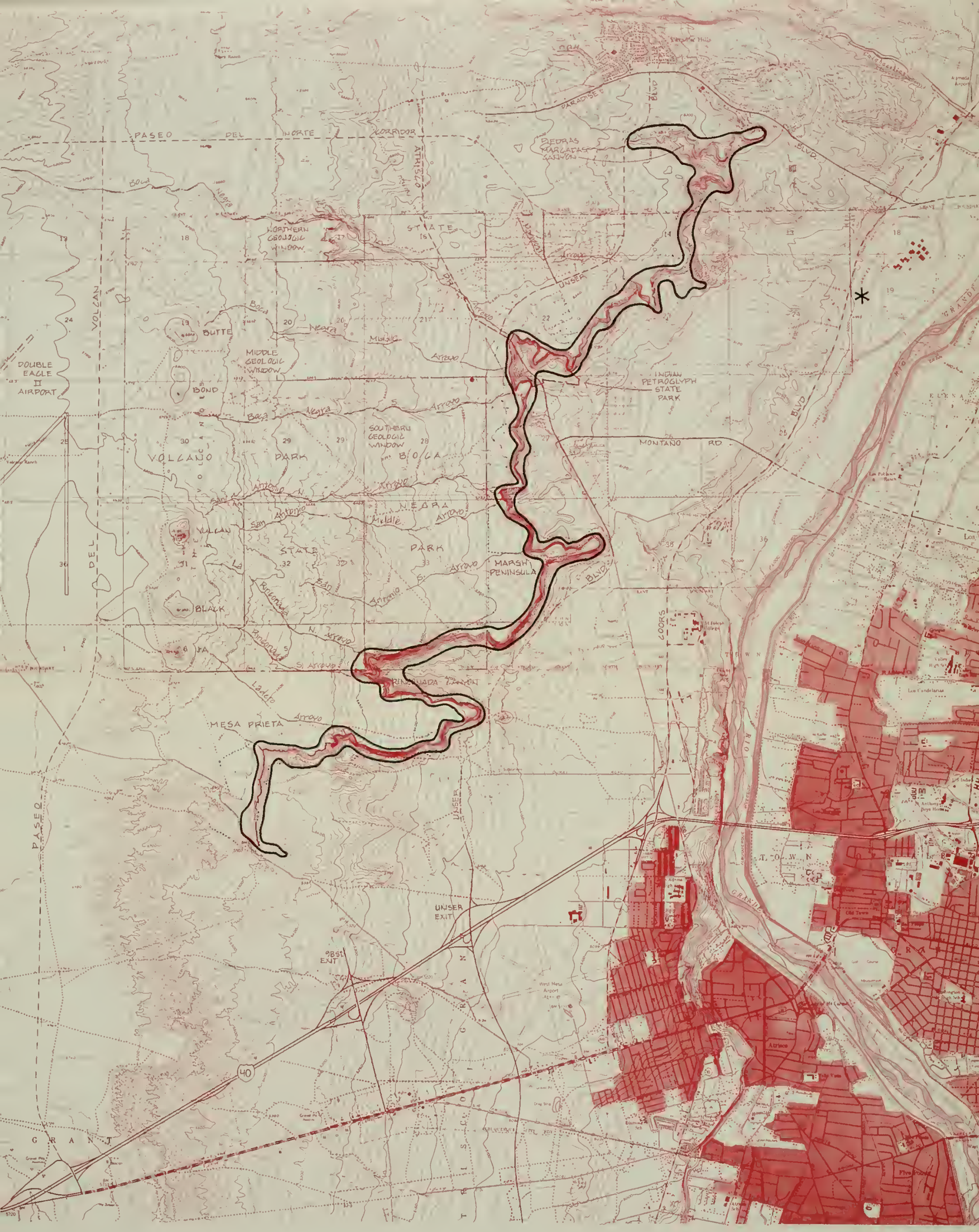
Las Imagines Archeological District

ALBUQUERQUE WEST MESA ◦ PETROGLYPH STUDY

U.S. Dept. of the Interior ◦ National Park Service

NM-PETR/80,004

JUNE 87 /SWRO



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Legend

— Las Imagines Archeological District

* Zuris—Mann Site on the National Register, but not part of Las Imagines Archeological District

Las Imagines Archeological District

ALBUQUERQUE WEST MESA ◦ PETROGLYPH STUDY

U.S. Dept. of the Interior ◦ National Park Service

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concentrations of Rio Grande Style petroglyphs in the Middle Rio Grande Valley. The Rio Grande Style is one of the most dramatic in content, style of execution, and complexity in the Southwest. Unfortunately, several concentrations of these petroglyphs have been damaged or destroyed by highways, dams, and other developments. Because of this progressive loss of Rio Grande Style rock art, the preservation of the West Mesa petroglyphs becomes increasingly important.

The content of the West Mesa petroglyphs and the endless variety of the figures amplifies our understanding of the religion of the Rio Grande pueblos in the Albuquerque vicinity between A.D. 1350 and 1680. In the Rio Grande Style are preserved the roots of contemporary Pueblo religious iconography found in kachina masks, altar paintings, puppetry, and other ceremonial paraphernalia. The potential for interpretation of the Rio Grande Style is vast since the figures represented are closely related to those present in ceremonial art today. Many specific kachinas, some of which were once thought to have been present only in the western pueblos of Zuni and Hopi, can be identified in the Rio Grande Style on the West Mesa. Whole figure complexes including kachinas, animals, birds, and snakes can be understood in terms of contemporary Pueblo iconography. Overall, the rock art of the West Mesa is a dramatic document of the history of Pueblo ideology.

The West Mesa rock art is close to major population centers, increasing the opportunity for education and research. Of the large rock art sites in the Western United States, many are in remote locations or on private lands and inaccessible. The Albuquerque rock art is near two major interstate highways and an urban center with excellent visitation possibilities. The petroglyphs have dramatic visual appeal and potential for interpretation of their symbolic and conceptual continuity with the present.

The West Mesa petroglyphs are significant as a very large concentration of highly designed art forms spanning a time period of at least 3000 years. The petroglyphs retain a high degree of integrity even though they are readily accessible to a growing urban population. This extensive concentration of rock art is not only a rich visual gallery of prehistoric and historic artistry but also an outdoor research laboratory, where important symbolic cultural meaning and values, including the roots of contemporary Pueblo Indian iconography, are preserved. The West Mesa petroglyphs represent a vital part of our National heritage that is rapidly being destroyed.

NATURAL RESOURCES

Natural resources of national significance are those which have exceptional values or qualities illustrating or interpreting the geological and ecological themes of our Nation. The volcanic escarpment on the West Mesa forms a low, dark line beyond the river woodland the length of central Albuquerque. Above the escarpment in a line along the western horizon are the five volcanic cones. The escarpment and cones form one of three major elements that make Albuquerque's landscape distinctive. The other two--the Rio Grande woodland and the Sandia Mountains--can be seen from many places on the West Mesa as well as from Albuquerque. They remind visitors at the petroglyphs that these three elements were the larger scale, day-to-day world of the prehistoric people who lived here.

The West Mesa and volcanoes also play a major role in defining urban form for the metropolitan area. The visual character of the urban area is directly linked to the integrity of this landform. In this regard the West Mesa is very significant to the local and regional area.

The natural and cultural resources of the West Mesa are directly linked and inseparable. The black basaltic rock of the lava flows and volcanoes provided a natural

"canvas" for the rock art of those that lived along the Rio Grande. The daily lives of the early inhabitants of the valley and West Mesa were directly linked to the geological and biological resources of the mesa.

The natural resources of the study area are primarily classified under the natural theme "Works of Volcanism" as identified in the National Park System Plan--Part Two for the natural history of the Colorado Plateau and the Southern Rocky Mountains. The volcanism theme is important for these two geographic regions and is represented (approximately 70 percent) within the National Park System.

Three features of the Albuquerque volcanoes are nationally significant: The mixed variety of pryoclastics (spatter and cinder) and lava flows composing the five cones is not clearly represented among other small basaltic cones in the National Park System. The erosional "windows" on each of the three branches of Boca Negra Arroyo penetrate all lava flows at each site and expose alluvium of the Santa Fe "formation" below. These windows are "kipukas" or hills of alluvium that were surrounded by flows and later removed entirely by erosion to form basins. These holes in the lava help geologists to map the extent of each flow and are important geomorphic features. Also, when the Albuquerque flows cooled approximately 190,000 years ago, the orientation of the earth's magnetic field was recorded by crystals of iron-bearing minerals in the basalt. University of New Mexico geologists have discovered that the magnetic field at that time was radically different from its present orientation and does not match any other departure of that age elsewhere in the world. This paleomagnetic record has global significance.

THREATS TO THE RESOURCES

The importance of the West Mesa to the Albuquerque area has been well recognized by local governments and citizens. The city of Albuquerque, assisted by many concerned individuals, has been pursuing a major open space preservation program that includes the West Mesa, the escarpment, and the volcanoes.

Major segments of the escarpment and adjacent land have been zoned for residential and commercial uses, platted, and sold. In some locations such as the Volcano Cliffs subdivision, annexed to the city in 1964, the land has been subdivided into thousands of lots and sold to individual owners. This increases the difficulty and expense of establishing a land base for public protection of the escarpment and the petroglyphs.

Development pressures for residential, commercial, and highway uses are resulting in direct threats to the petroglyphs, the Zuriss-Mann site, and the integrity of the West Mesa. As urban growth expands around the West Mesa study area, pressures will increase to utilize parts of the area for development needs such as new road and utility corridors and public facilities. Land developers are proceeding with city approved plans for residential developments which reach the base of the escarpment. If actions are not undertaken promptly, the resources will be lost. Approval of the city's Northwest Mesa Escarpment Plan was an important first step, but it is highly unlikely that the city will be able to acquire funds to protect most of the West Mesa's major resources.

The escarpment and associated petroglyphs represent a large outdoor laboratory for research and education. Little is currently understood about the complexity of these cultural resources. The petroglyphs should remain in their original location and physical context. Relocation or disturbance of the rock art would greatly impact the opportunity to research and understand the full significance of the cultural resources.

The rock art is currently threatened by vandalism along the 17-mile escarpment and within the volcanic windows. While the city is doing the best they can with

limited enforcement staff, present funding and staff capability is inadequate to provide minimal protection. As urban development continues westward to the escarpment, vandalism will increase. Protection and education programs need to be organized now to prevent widespread resource impacts.

The feasibility of protecting the escarpment and the petroglyphs is good if prompt action is taken. The area most suitable for some form of National Park Service management is along and west of the southern half of the escarpment. This area includes a large, relatively unimpacted land area which, if combined with the mesa and some of the volcanoes, could become the focus of interpretation and visitor use.

Santa Fe Village I is in the middleground, with the Marsh Peninsula and Manzano Mountains in the distance. Construction wastes have been dumped in the foreground, covering parts of a petroglyph site.

alternatives for management

ALTERNATIVE 1
National Park Service Management

Alternative 1 provides for the creation of a national monument with management by the National Park Service. The monument would cover approximately 8,470 acres and would include the entire escarpment except for Indian Petroglyph State Park. It would also include Piedras Marcadas Canyon, the Rinconada, all of Volcano Park, the mesa top and some land below the escarpment south of Volcano Park, the Northern Geologic Window, the southern one-quarter of Boca Negra Park, and the Zuris-Mann archeological site. The National Park Service would work with the city and state as well as adjacent private landowners to encourage compatible uses on adjacent lands. Private land within the boundary could be acquired through donation, exchange, or purchase. State and city land would be acquired through donation or exchange.

Under National Park Service management, the major goals for the national monument would be (1) preservation and protection of the monument's resources--the petroglyphs, archeological sites, geology, and ecology--and (2) access to and interpretation of those resources to the public.

Because the petroglyphs and archeological sites are fragile and irreplaceable and because many of the petroglyphs and sites have religious significance, the monument should give the impression of a special place set aside for its nationally significant resources. The educational aspects of the resources would be emphasized, and recreation would be limited to activities having little impact on the environment and ambiance of the monument. Opportunities for contemplation and relative solitude, as well as more social experiences, would provide respite from the adjacent urban environment.

After authorization of the monument by the U.S. Congress, decisions on the type, extent, and specific location of developments would be made in a general management plan for the monument. The planning team would include representatives of the federal, state, and city governments, and the public would be fully involved.

It is probable that a visitor center would be located near the southern tip of the mesa containing an information desk, exhibits, audiovisual materials, publications, and restrooms. A rock art research center is also a possibility. Smaller facilities for information and interpretation could be located at Piedras Marcadas, Volcano Park, and/or the Rinconada. Other facilities could include trails with educational materials. Because one of the management objectives would be to preserve the cultural resources in their natural setting, these facilities would be designed to minimize impact on the monument, serving as a transition from the urban context to the prehistoric, historic, and natural values of the monument.

Boundary options: The upper half of Volcano Park would remain in city ownership and under city management. General city recreational needs would be provided on these lands by the city Department of Parks and Recreation.

If the route of Unser Boulevard is relocated to the south of Indian Petroglyph State Park, land between the present park boundary and the roadway could be acquired and managed by the city as part of the park.

ALTERNATIVE 2
City, State, National Park Service Management

Alternative 2 provides for a national monument of

Legend

- National Park Service
- * Zuris–Mann Site

ALTERNATIVE 1

National Park Service Management

ALBUQUERQUE WEST MESA ◦ PETROGLYPH STUDY

U.S. Dept. of the Interior ◦ National Park Service

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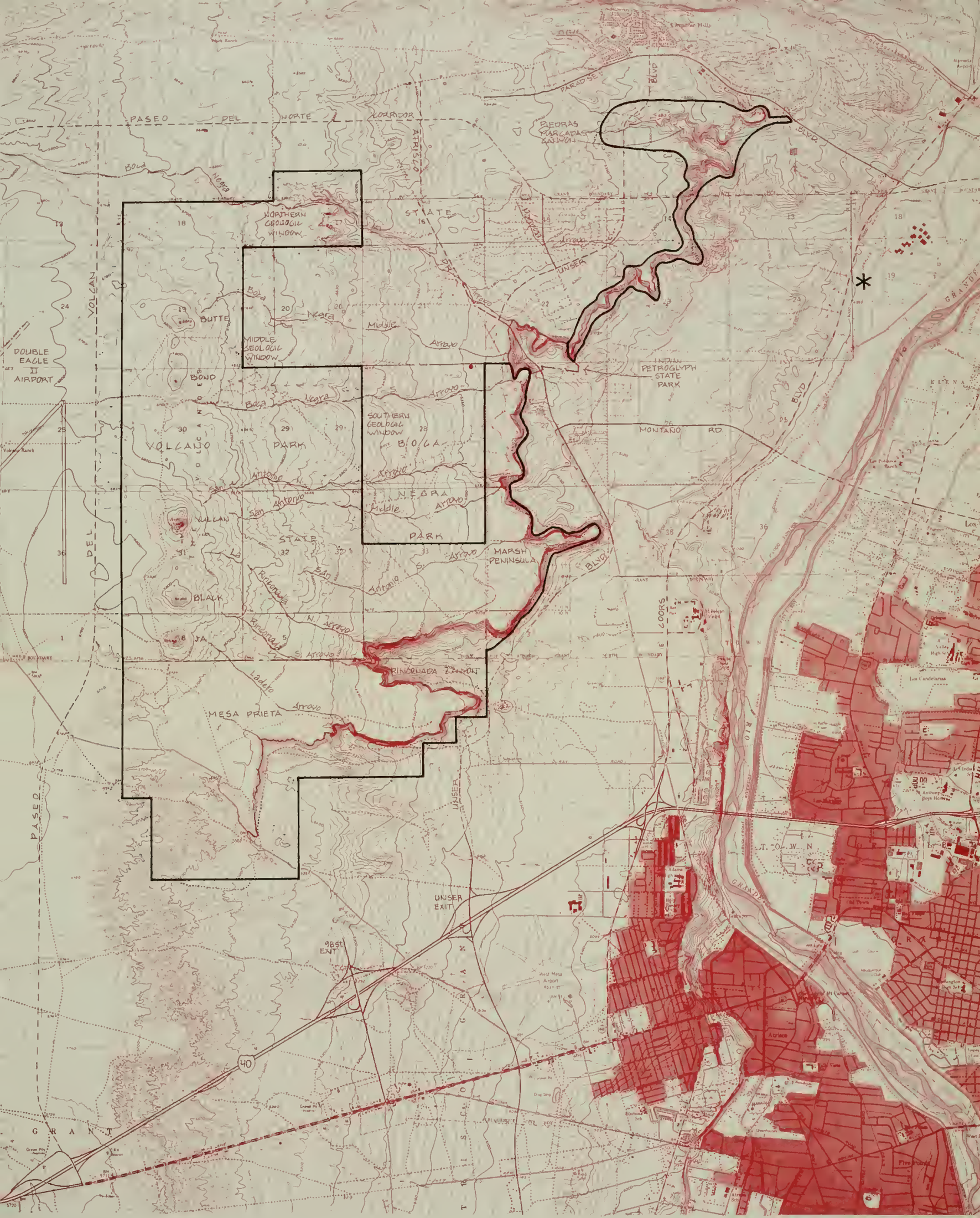

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Legend

— National Park Service

* Zuris–Mann Site

ALTERNATIVE 1

National Park Service Management

ALBUQUERQUE WEST MESA ○ PETROGLYPH STUDY

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approximately 7,504 acres to be owned and managed by the city of Albuquerque, the state of New Mexico, and the National Park Service. The Park Service would manage the southern part of the mesa below Volcano and Boca Negra parks, some land below the escarpment to the south, the southern half of Volcano Park, and the southern one-quarter of Boca Negra Park. The section of the escarpment roughly from the Marsh Peninsula north to Indian Petroglyph State Park and the lands from Boca Negra Park eastward to include the escarpment and one line of lots below the escarpment would be acquired by the federal government and exchanged to the city for the southern part of Volcano Park, provided land values were equal.

Indian Petroglyph State Park, which is owned and managed by the city of Albuquerque, would be extended north along the escarpment. Additional privately owned lands would be acquired by the state, but it is likely that the city would manage the area. The city of Albuquerque would acquire and manage the remainder of the escarpment to the north including one line of lots along the top and bottom of the escarpment. The city would also continue acquisition of Piedras Marcadas Canyon including a 300-foot conservation area around the canyon and the Northern Geologic Window, while continuing ownership and management of the two northern volcanoes. The Zuris-Mann archeological site would be acquired by the city. Some land within Volcano Park and the northern two-thirds of Boca Negra Park would remain in city ownership outside of the national monument boundary.

The headdress of this anthropomorphic figure extends over the edge of the rock and out of sight. The arms and hand-like objects are unique.

If legislation were passed implementing Alternative 2, a management plan for the monument would be developed by the city, state, and National Park Service as in Alternative 1, to address the following issues: visitor transportation and circulation; type, extent, and location of facilities; themes for interpretive programs; strategies for coordinating administration, maintenance, and research; and other issues in the coordinated management of the area. It is probable that the National Park Service would develop a visitor center near the southern tip of the mesa. The center would contain an information desk, exhibits, audiovisual materials, publications, and restrooms, and possibly a rock art research center. Other visitor contact facilities could be located at Piedras Marcadas, Volcano Park, and the Rinconada.

Legislation authorizing the monument would include a strong statement of the purpose of the monument but would allow for different management emphases in the two management areas (city/state and federal). The legislation would also authorize the National Park

Service to provide technical and financial assistance for interpretation and resource management of city/state lands within monument boundaries. The National Park Service area would be managed as described under Alternative I with the overriding concerns being (1) preservation and protection of petroglyphs, archeological sites, and other monument resources, and (2) providing for visitors to experience the resources in a natural setting. Management in some of the city/state areas, while protecting the cultural and natural resources, would likely place more emphasis on recreation and on recreation-oriented developments than National Park Service management.

Boundary options for expansion of Indian Petroglyph State Park:

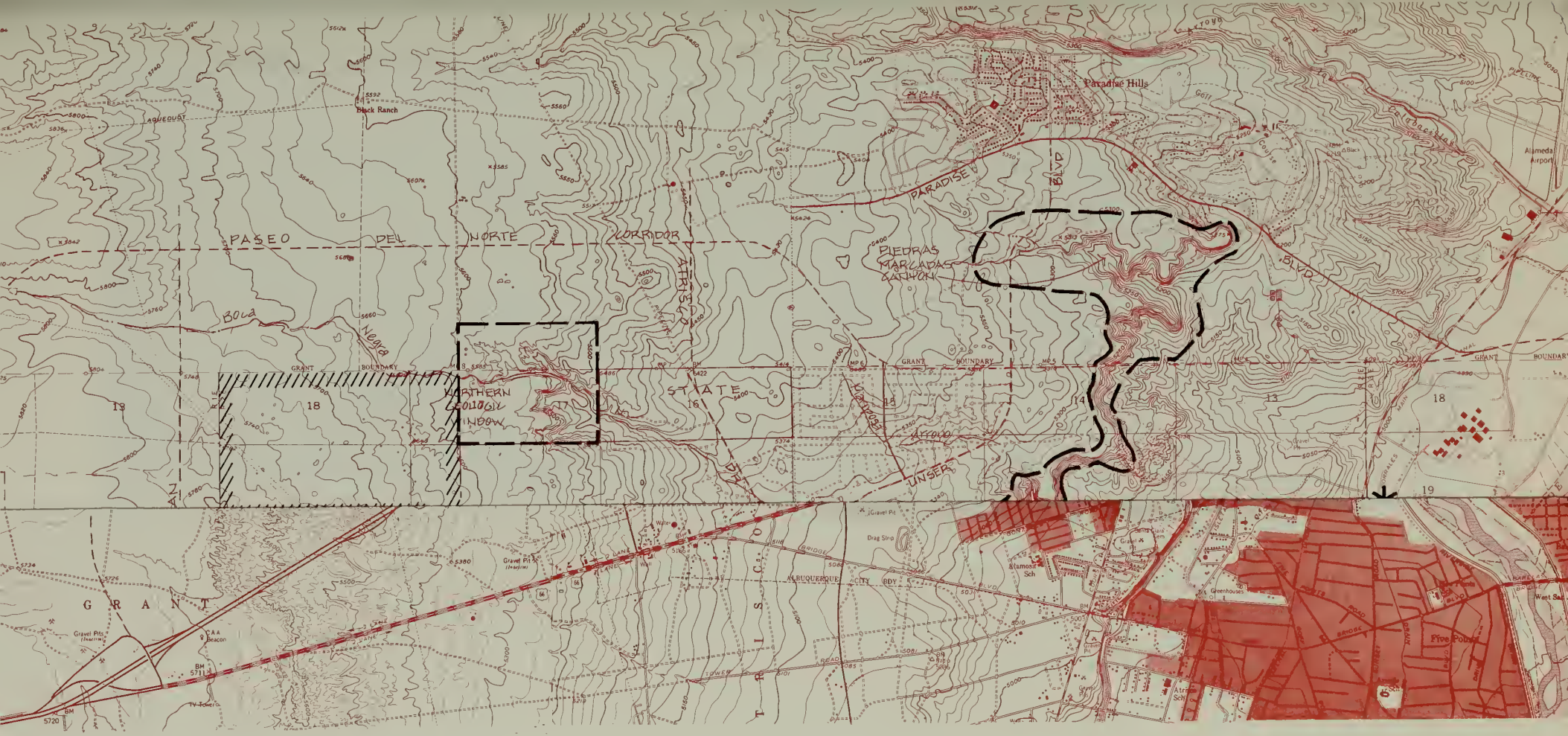
1) There would be no expansion of the state park area by the state of New Mexico; the city would acquire the land north of and around the state park.

2) The park would expand along the escarpment to the south as well as to the north. If the route of Unser Boulevard is relocated to the south of Indian Petroglyph State Park, land between the present park boundary and the roadway would be acquired and managed by the city as part of the park.

3) Immediately above and below the escarpment, the acquisition area could vary in width, with acquisition focused on petroglyph concentrations.

Boundary option: In the area of the Volcano Cliffs subdivision from the Marsh Peninsula north to the Indian Petroglyph State Park, only the escarpment and one line of lots above and below the escarpment would be acquired. The remainder of the land from the first lot line above the escarpment to Boca Negra Park would be excluded from the boundary.

A beautiful star-being mask with feathered headdress and two marks obliquely crossing the face. This figure is on a privately owned lot, which could not be developed without cutting into rocks where petroglyphs are located.



N

0 2000 4000 FEET

Legend

- City
- State Park
- State Park Expansion
- National Park Service
- Zuris–Mann Site
- NPS acquisition, City management
- City Open Space (Not in boundary)

ALTERNATIVE 2

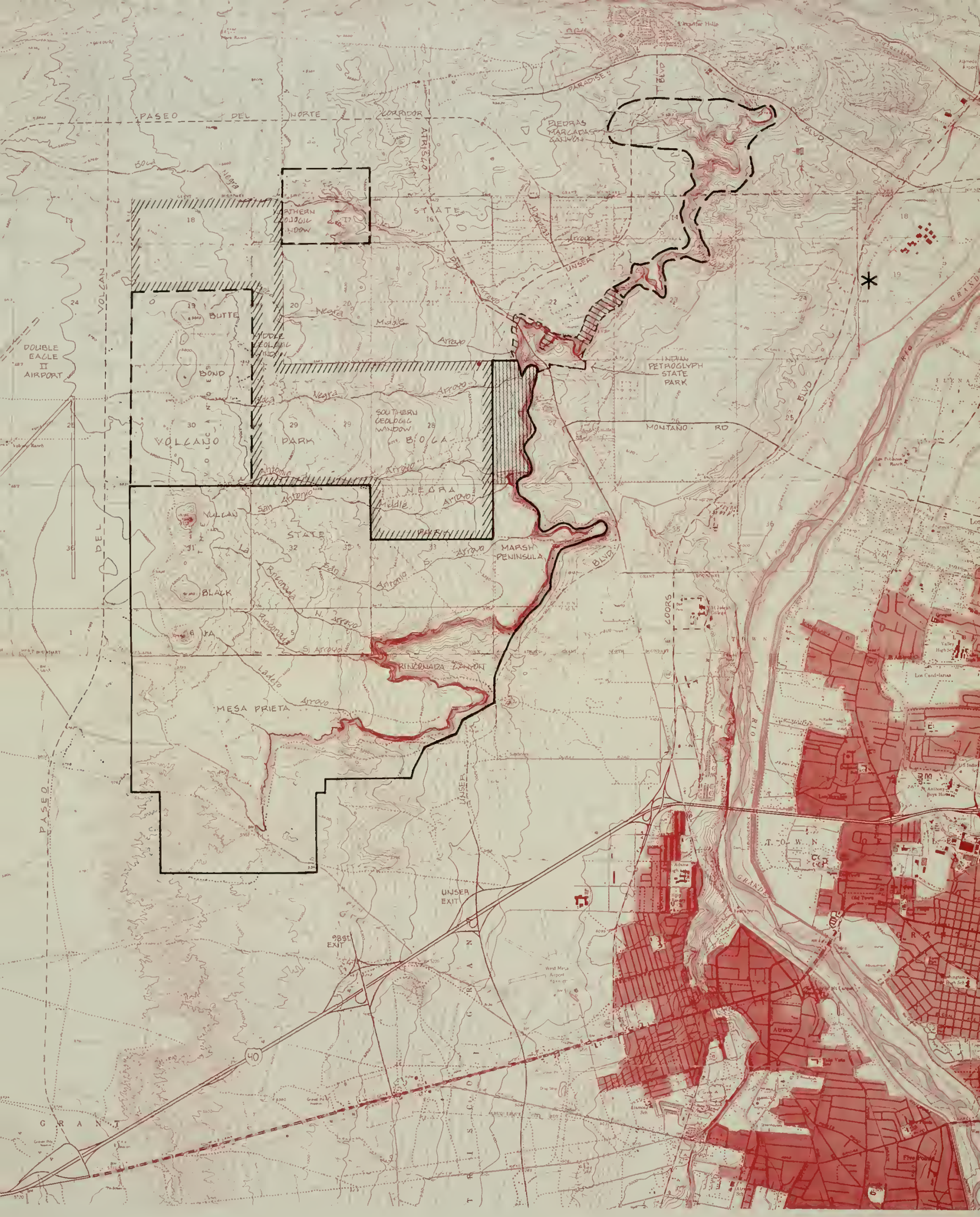
City, State and NPS Management

ALBUQUERQUE WEST MESA ◦ PETROGLYPH STUDY

U.S. Dept. of the Interior ◦ National Park Service

NM-PETR/80,006A

OCT. 87/SWRO



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0 2000 4000 FEET

Legend

- City
- State Park
- State Park Expansion
- National Park Service
- Zuris–Mann Site
- NPS acquisition, City management
- City Open Space (Not in boundary)

ALTERNATIVE 2

City, State and NPS Management

ALBUQUERQUE WEST MESA ◦ PETROGLYPH STUDY

U.S. Dept. of the Interior ◦ National Park Service

NM-PETR/80,006A

OCT. 87/SWRO

A large metate, once used for grinding grain, is adjacent to a densely carved panel. Over 300 grinding features have been identified along the escarpment.

This petroglyph panel has been pockmarked by gunfire.

ALTERNATIVE 3
City, State, Private Sector Management

Under Alternative 3, an area of approximately 8,860 acres would be owned and managed by the city and state with the cooperation of private landowners. The boundary would include all of the escarpment, a strip of land one lot deep immediately above and below the escarpment, Piedras Marcadas Canyon, Indian Petroglyph State Park, Boca Negra Park, Volcano Park, the Northern Geologic Window, the mesa top south of Volcano and Boca Negra parks, and the Zuris-Mann archeological site.

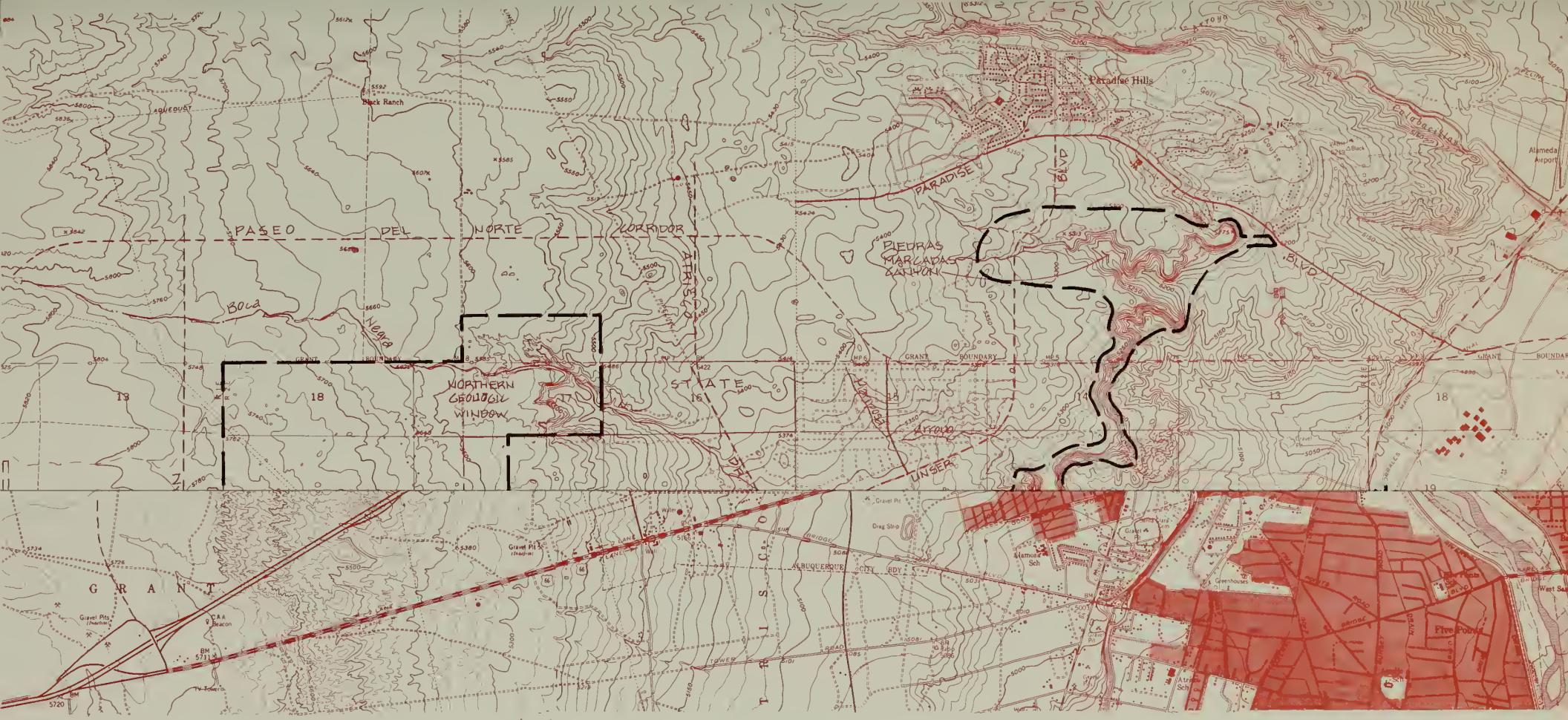
Indian Petroglyph State Park would be expanded to the north to include an area with outstanding concentrations of petroglyphs. The expansion would include the escarpment and a strip of land immediately above and below the escarpment. This additional land for Indian Petroglyph State Park would be acquired by the state of New Mexico. The state would also acquire the Zuris-Mann archeological site. It is likely that once the state of New Mexico provided funding for land acquisition and facility development as well as other major costs, the city of Albuquerque would provide day-to-day management as it does at the present Indian Petroglyph State Park.

The remaining lands within the boundary would be protected in accordance with the city's Northwest Mesa Escarpment Plan (approved, November 30, 1987), which provides for (1) a conservation area to remain open space in perpetuity, including the face of the escarpment and setbacks varying in depth depending on the environmental sensitivity of the area and the extent of existing development; (2) an impact area defined as the 350 feet immediately adjacent to the conservation area, where various zoning ordinances, development guidelines, and regulations would reduce the impacts of development on the adjacent open space; and (3) a large view area in which design regulations would protect the view of the area from a distance.

The city's open space program has the following purposes: to serve recreational needs, to psychologically and visually offset urbanization, and to conserve natural resources. In the case of the West Mesa, conservation of petroglyphs and archeological sites is also a major goal. It is likely that the city would place a higher priority on local recreational needs than would the National Park Service and would be more attuned to local concerns in general.

Option for Management: All or part of the park described in this alternative could become an affiliated National Park System unit. Affiliated areas comprise a variety of properties in the United States and Canada that preserve significant resources outside the National Park System. They are neither federally owned nor directly administered by the National Park Service, but they receive some technical or financial assistance from the federal government and are recognized as having national significance. Generally, affiliated area status does not result in the same level of research or funding as National Park System areas receive.

Boundary options for expansion of Indian Petroglyph State Park:
1) The city rather than the state would acquire lands north of the state park.
2) The park would expand along the escarpment to the south as well as to the north. If the route of Unser Boulevard is relocated to the south of Indian Petroglyph State Park, land between the present park boundary and the roadway would be acquired and managed by the city as part of the park.
3) Immediately above and below the escarpment, the acquisition area could vary in width.


PASEO DEL NORTE CORRIDOR
PARADISE BLVD
PIEDRAS MARCADAS CANYON
NORTHERN GEOLOGIC WINDOW
STATE
Paradise Hills
Black Ranch
Alameda Airport
Five Points
GRANT
ALBUQUERQUE CITY BDY
Gravel Pits
Drag Strip
Greenhouses
Arroyo
Tijeras Arroyo
Tijeras Creek
Tijeras
Boca Negra
Unser
Coors
Golf Course
Aqueduct
Tower
Bridge
Road
Blvd
Sch
Gravel Pit
CAA Beacon
BM 5711
BM 5720
BM 5422
BM 5376
BM 5010
BM 5081
BM 5160
BM 5031
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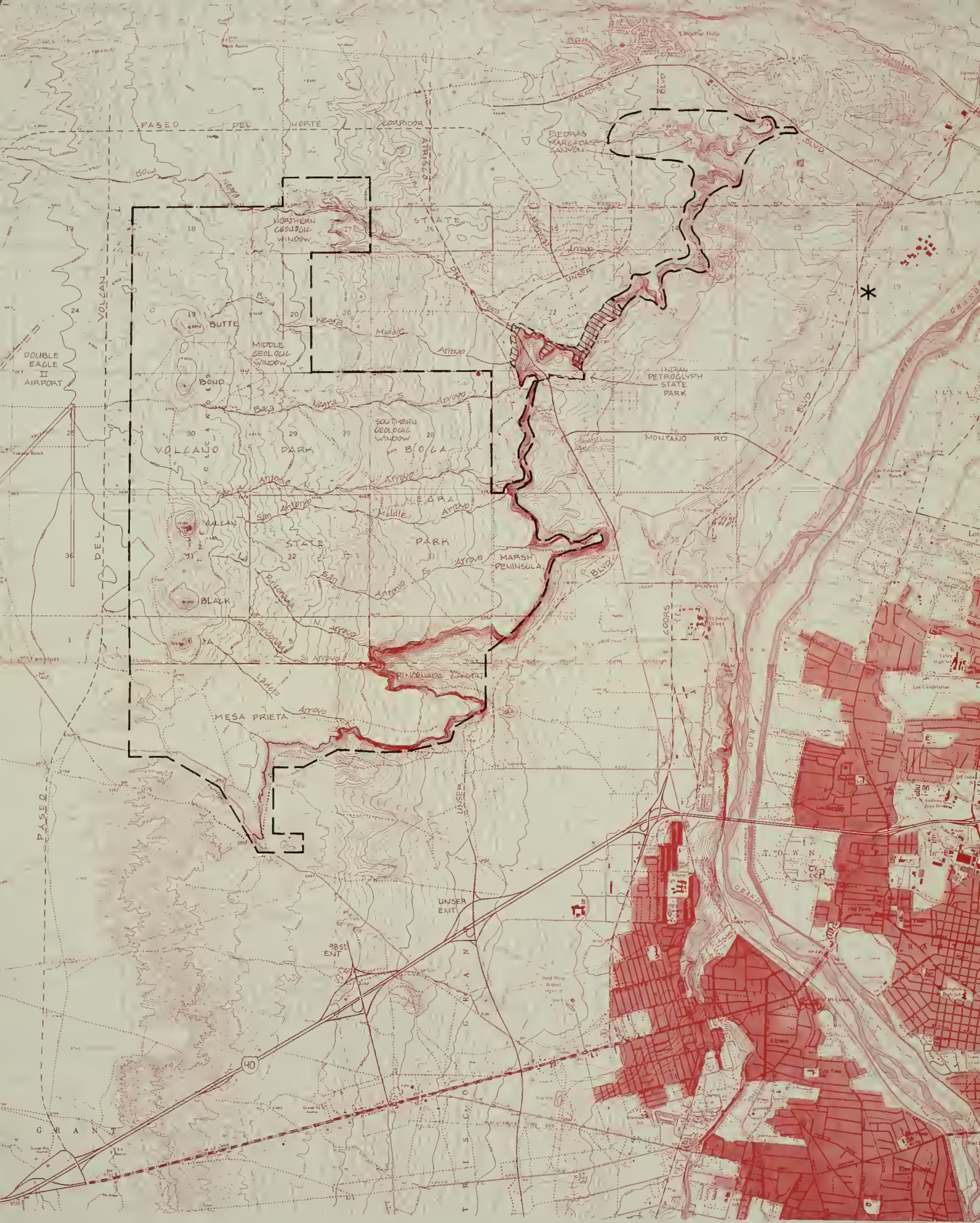


N

0 2000 4000 FEET

Legend

- City
- State Park
- State Park Expansion
- Zuris—Mann Site

ALTERNATIVE 3

City and State Management

ALBUQUERQUE WEST MESA ○ PETROGLYPH STUDY
U.S. Dept. of the Interior ○ National Park Service

NM-PETR/80,007
JUNE 87/SWRO

Resource Protection

Under all three alternatives, the petroglyphs and related sites would receive protection from urban development, shooting, and vandalism through fencing, ranger patrols, and programs to educate the public on the significance of the petroglyphs. In Alternative 3--City, State, Private Sector Management--the boundary is closer to the escarpment at the southern end than in the other alternatives and the area between Boca Negra Park and the escarpment is deleted. Even though no important archeological or natural features are excluded, the proximity of the boundary to the escarpment could increase the potential for vandalism and trespass.

Providing protection for resources as fragile and accessible as the petroglyphs will be expensive and time-consuming for whoever manages the area. Funding would be needed first for land acquisition and then for ongoing protection efforts. Obtaining adequate funding would be a concern for the National Park Service in Alternative 1 and for the city and state in Alternative 3 because of the large area to be acquired and controlled by the Park Service or the city/state and the cost of land in an urban area.

Research on the natural and cultural resources is necessary to make effective management decisions, and expertise in preservation methods and interpretation is also essential in managing cultural resources. National Park Service involvement, as in Alternatives 1 and 2, would be an asset in resources management because of the agency's long experience in research and preservation. The option under Alternative 3 for an affiliated area would provide the same benefit, but to a much lesser extent.

Many of the petroglyphs relate closely to Pueblo religious imagery, and the area continues to receive use for religious purposes by Pueblo Indians. If the federal government is involved in managing the area, the American Indian Religious Freedom Act (P.L. 95-34) and the Department of the Interior's Native American Relationship Management Policy (Federal Register, September 22, 1987) would apply, and the right of Native Americans to practice traditional religions would be protected. Furthermore, Indian groups would be consulted in all planning for the monument.

Visitor Experience and Use

The differences among the alternatives in regard to the visitor use of the monument and the kind of experiences offered are mainly a matter of emphasis and agency capabilities. As described under Alternative 1, National Park Service management is strongly oriented toward preservation of cultural and natural resources and retaining the natural setting of the resources. Also, the religious significance of many of the petroglyphs and archeological sites would be fully respected. Visitor facilities would be limited to those needed to provide access to and an appreciation of the resources. Eventually, however, the study area will be surrounded by urban development, and there will be demands for recreation that would go beyond the activities usually provided in a national monument. The city and state governments have the capability to be more responsive to these important recreation needs and to local concerns than the National Park Service.

In Alternative 1, the National Park Service would manage the area as a national monument, with emphasis on preservation and interpretation of the rock art, related archeological sites, and the natural environment. Opportunities for recreation would be limited to those

ACREAGES, ESTIMATED LAND VALUES
West Mesa Petroglyphs Area
Albuquerque, New Mexico

Alternative	Acres within Boundary	Present Land-ownership	Land Values For Private Lands
1. **NPS/State Management**	4,505	City	By federal government $54,000,000–$59,000,000
	738	State	
	3,230	Private	
	8,473	Total	
2. **NPS/State, and City Management**	3,374	City	By city $22,000,000–$24,000,000
	738	State	
	3,392	Private	
	7,504	Total	
			By state $5,000,000–$6,000,000
			By federal government $46,000,000–$51,000,000
		Total for Alternative 2	$73,000,000–$80,000,000
3. **City/ State Management**	5,619	City	By city/state $44,000,000 – $48,000,000
	738	State	
	2,508	Private	
	8,865	Total	

The land values in the above chart are rough, preliminary estimates of 1987 land values prepared by the National Park Service. If legislation is introduced by Congress, a detailed cost estimate will need to be prepared.

activities having minimal impact on the resources and ambiance of the monument. The experience of the monument as a special place set aside from the mainstream of contemporary urban life because of its outstanding resources would be enhanced by the expanse of open, essentially undeveloped land within the Alternative 1 boundary. Needs for recreation incompatible with National Park Service management would have to be met by the city at Boca Negra Park and at other city parks outside the boundary.

Under Alternative 2, consistency in management would depend on (a) the similarities in goals and objectives of the National Park Service and the city of Albuquerque, especially the Open Space program; (b) a clear statement of purpose in the authorizing legislation; and (c) the preparation of a management plan by the city, state, and National Park Service that would be approved by the Secretary of the Interior. It is probable that the visitor's experience and use of the monument would be similar to Alternative 1. Alternative 2, however, would be more responsive to local recreational needs in the city/state management areas, and would directly involve all three levels of government in a cooperative protection program. Although cooperative planning would minimize differences in management within the monument, there may still be differences in rules and regulations, in activities, and in the appearance of facilities and personnel.

Visitor use and enjoyment under Alternative 3 would depend on the city's and state's plans for the area. As stated above, city and state management would be more attuned to local recreational needs. Although there would be sensitivity to the rock art and other cultural resources, purely recreational development and use would likely be more substantial than in the other alternatives.

The boundary of Alternative 3 is much closer to the escarpment at Mesa Prieta than in Alternatives 1 and 2. Also most of the mesa top between Boca Negra Park and the escarpment is not within the Alternative 3 boundary. Therefore, the views would be more constricted by urban development, and the general atmosphere of the park would be more urban. Interpretive and recreational opportunities would be limited, and facility developments for visitor use below the escarpment at Mesa Prieta would be restricted in scope and hemmed in by private developments.

Because the park would not have the visibility and status of a national monument in Alternative 3, out-of-state visitation would be considerably lower; but if, as expected, there is more recreational development, the local visitation could be significantly higher.

Costs

Under Alternative 1, the cost of acquiring land and managing the monument must be borne solely by the National Park Service. Funding at this level could be very difficult to obtain from Congress, especially in a short length of time. Because of the rapid growth on the west side of Albuquerque and rising land prices, funding for land acquisition would be needed soon after passage of legislation authorizing the monument to avoid uncertainty for landowners and to forestall private development of lands proposed for public use. The same situation regarding funding holds for Alternative 3, where the city and state would carry the entire burden of land acquisition and future management.

Another concern regarding land acquisition under Alternative 1 is that the city of Albuquerque owns not only Volcano and Boca Negra parks but also lands at Piedras Marcadas and the Northern Geologic Window.

The federal government is usually limited to acquiring lands from state and local governments by exchange or donation. Having expended considerable funds and effort to acquire these lands, the city may be reluctant to donate them to the federal government. An exchange for federal lands elsewhere in New Mexico could be possible but time-consuming and expensive in terms of administrative costs. Federal management of city lands could be undertaken on an interim basis under a cooperative agreement.

Alternative 2 allows for the substantial costs of a petroglyph national monument to be shared by the federal, state, and local governments. Under this arrangement the funds for land acquisition and development might be available sooner. The significant operating costs would also be shared. The federal government would provide funds and technical assistance in the development and management of Piedras Marcadas and other city and/or state areas. This would enhance the city of Albuquerque's ongoing efforts in preservation and management of the West Mesa.

If the boundary option for federal acquisition of only the escarpment and one lot above and below the escarpment between the Marsh Peninsula and the state park is considered, the costs between Boca Negra Park and the line of lots adjacent to the top edge of the escarpment would be saved. This would reduce the cost of federal acquisition under Alternative 2 by $6,000,000 - $7,000,000.

Landowners

Although much of the land within the various alternative boundaries is in public ownership--Volcano Park, Boca Negra Park, Indian Petroglyph State Park, and some smaller tracts--all three alternatives would have significant impacts on private property owners. Alternative 3, which includes significantly less private land than the other two alternatives, would have the least effect on landowners.

Although no developed properties would be involved in the acquisition process and no one would have to relocate their home or business, many property owners, especially in the Volcano Cliffs area, would be unable to realize plans for future homes, and proposed large-scale developments would not be built. All property owners whose land is acquired would receive fair market value for their holdings. An important consideration under any of the alternatives is the effect on landowners of delay in the acquisition process. Once acquisition is authorized, the process should move as quickly as possible.

Management

Single-agency management of a park or monument as in Alternatives 1 and 3 has some advantages: The goals and objectives for the entire area would be uniform. There might also be cost savings in terms of staff time and operating funds if extensive inter-agency communications and coordination are not necessary. Furthermore, the cost and time required for a major inter-agency planning effort following passage of legislation for a petroglyph park or monument would be saved.

In Alternative 2 consistency in management of the area would result from the stated purposes of the monument in the authorizing legislation and the development of an inter-agency management plan for the monument. The development of the plan and the day-to-day coordination and communication needed to implement

the plan could be costly in terms of staff time and therefore operating costs. Inter-agency planning and management, however, has major advantages because a wider range of experience and expertise is available to manage the area than in the case of a single-agency. The inter-agency approach provides for joint funding and staffing of individual projects related to the park, from research to visitor activities, that one agency could not accomplish alone.

TRANSPORTATION AND CIRCULATION

The West Mesa study area is in an expanding urban fringe area of a rapidly growing metropolitan complex. Competition for use of land and space is increasing. Transportation needs are becoming more complex as the need to quickly reach access points across the Rio Grande expands. The majority of vehicular destinations are east of the Rio Grande. River crossings are limited, resulting in increasing numbers of north-south trips to Interstate 40. This trend will increase.

The Long Range Major Street Plan includes several major transportation corridors and arterial street improvements within and surrounding the study area. Unser Boulevard, the Ladera (98th Street) extension, Paseo Del Norte, Paseo del Volcan, and the proposed Kimmick/81st street alignment all may result in major impacts within the vicinity of the escarpment and, in some cases, to the petroglyphs.

As urban growth increases on the west side of the city of Albuquerque, pressures will mount to use open space lands for transportation and utility corridors. Transportation needs require careful reevaluation to assure minimal impact to the cultural, natural, and scenic resources of the West Mesa. Decisions such as where and how to cross the escarpment with a road or utility corridor should be made with full consideration for the potential impacts on natural and cultural resources. The social need for open space and the benefits of this open space to those that will live along the escarpment is also a very important decision-making factor.

Every effort should be made to keep roads off the escarpment and to seek alternative solutions to the transportation and circulation needs of the vicinity. Unser Boulevard, Paseo del Norte, the Ladera (98th street) extension, and Paseo del Volcan could be designed to special parkway standards. Views of the escarpment, mesa, and volcanoes should be accentuated by road design and, where possible, roads should form a transition from urban development to open space. Streetscape improvements should be similar along these road corridors to help establish a sense of a special place and a design standard for the study area.

The city should pursue other alternatives to the proposed Kimmick/81 street alignment, which would cross the escarpment at the Rinconada and continue northward, because of the impact to the escarpment, major concentrations of petroglyphs, and the scenic quality of the area.

The proposed alignment of Unser Boulevard passes through Indian Petroglyph State Park and along the western edge of Piedras Marcadas Canyon. Major impacts to cultural and natural resources and to important visitor use areas would result from construction along this alignment. The impact of a six-eight lane road through the park could not be mitigated. An already impacted area immediately south of the state park could provide an acceptable alternative alignment.

appendix

APPENDIX A: POTENTIAL ECONOMIC IMPACT

Visitation

Determining visitation and the number of out-of-state and in-state visitors is important in economic impact analysis because of the money brought into the local economy by visitors. Visitors who will be most attracted to the potential national monument will be those specifically interested in cultural resources of the Southwest, tourists driving through Albuquerque on Interstates 40 and 25, and residents of the Albuquerque metropolitan area interested in rock art and prehistory, or in a recreational experience such as hiking. Recreational users will spend less money in the local economy than will other visitor groups.

Traffic along Interstate 40 tends to be vacation-oriented, and many travelers will be interested in visiting sites like a petroglyph national monument.

A percent capture rate can be a good tool in determining future visitation rates. The capture rate of visitors will be influenced by the park name, good signing and access from major highways, proximity to major interstate highways, visitor facilities such as a visitor center, intensive promotion especially among overnight visitors in the region by tourism and lodging organizations, a well organized marketing and publicity program, the nature and extent of day-use facilities, and implementation of the Masau Trail auto-tour route established by Congress in December 1987.

Comparable National Park Service units that were evaluated revealed that the 1985 capture rate of out-of-state travelers varies from 2 percent at Walnut Canyon National Monument near Flagstaff, Arizona to 23 percent at Petrified Forest National Park near Holbrook, Arizona. Montezuma Castle National Monument in Arizona which has some similiarities to the petroglyph area, had a capture rate of 12.5 percent. If a national monument is established, the new area could possibly capture between 3 percent and 6 percent of out-of-state visitors. At the present Albuquerque area visitation level of 5,770,000, this would range from 173,000 to 346,000 monument visitors.

Overnight visitors may be more likely to visit the park than pass-through visitors. It is anticipated that about 50 percent of the projected out-of-state visitors (75,000 to 150,000) would spend the night in the Albuquerque area.

The in-state visitors are likely to be making repeat visits and to be more knowledgeable of the site and visitor use opportunities. Use by this group will also depend on how much school use will occur. The potential national monument has excellent educational opportunities. Day use facilities, such as a hiking trail system will also have a relationship to in-state and regional visitation levels. The proposed new area may attract in-state visitation of 60,000 to 100,000 per year during the first 10 years following establishment. As the West Mesa area becomes more developed, local visitation will increase.

Visitation Summary

The results of the visitation analysis are included in the following range of estimates for future annual visitation:

in-state residents	60,000 - 100,000
out-of-state day use	75,000 - 150,000
out-of-state overnight use	75,000 - 150,000
	210,000 - 400,000

For comparison, other economic evaluations that have been undertaken for the proposed national monument

have estimated 66,000 - 91,000 (Economics Research Associates) to 400,000 (Albuquerque Convention and Visitors Bureau) for annual visitation. Similiar state monuments draw up to 30,000. Similiar national monuments in New Mexico and Arizona received 60,000 to 200,000 visits in 1987. The study team anticipates that the potential petroglyph national monument should substantially exceed this level of annual use because of its location, highway access, the association with the Masau Trail auto tour route, and marketing possibilities.

Economic Impact

Estimation of economic benefit from park visitors is a comparatively simple process. Alternatives which may result in lower visitation would have a correspondingly lower benefit. The economic impact for each visitation group is computed separately. For each group a low and high visitation projection has been anticipated following completion of facility development and media materials for the national monument.

Visitors from New Mexico (especially Albuquerque) will be important park visitors but will not contribute as much to the local economy as out-of-state visitors, because economic benefits are derived from the money spent in the area. Economic benefit from local visitation probably will not be very high. A figure of two dollars per visitor is estimated for this group. This would result in an annual expenditure of $120,000 to $200,000.

There will be a large amount of use by out-of-state residents who are passing through Albuquerque. This group may already be stopping in the area for gas and/or restaurants and other attractions such as "Old Town Albuquerque" because the city is the largest population center for hundreds of miles. A possible figure for the increased expenditure by this group beyond what they would normally spend if they did not visit a petroglyph park might be four dollars per person. This would result in an expenditure of $300,000 to $600,000 annually for this group.

The largest economic impact will result from out-of-state visitors who are spending the night in Albuquerque. Most of their expenditures will occur regardless of their park visit. However, many will increase their total length of stay. Several factors affect the amount of increase: visitors may require three hours (including driving) to see the park, some visitors will skip other area attractions to visit the park, and some will extend their visit when they learn of other area attractions.

A liberal estimate of the average net increase is four hours. A conservative estimate of two hours per visitor would result in an increase of 12,500 to 25,000 visitor days based on the projected range of visitation. At $34.00 per person per day (average daily vacation expenditure in the state adjusted for inflation), this results in a total for this group of $425,000 to $850,000.

Expenditure Summary

If these estimates and projected range of visitation prove reasonably correct, approximately 210,000 to 400,000 visitors would be spending an additional $845,000 to $1,650,000 annually in the Albuquerque area. This compares with estimates prepared by other groups or organizations that range from $162,000 to $19,000,000.

Assuming a multiplier effect of two, annual increased expenditures resulting from monument visitation in the Albuquerque area would range from $1,690,000 to $3,300,000. Assuming five percent of this is being paid as local and state taxes, total state tax revenue would increase by approximately $84,500 to $165,000.

If a national monument is established by Congress, the

National Park Service also would be impacting the local economy by creating approximately eighteen permanent and ten temporary jobs on the west side of Albuquerque. The annual operational expenditure would approximate $600,000–$800,000. Capital improvements will be required to make the proposed national monument operational. Several millions of dollars would be spent by the Federal government in developing visitor use facilities.

View of Rinconada Canyon looking west toward the volcanoes. The serenity and relative isolation of the Rinconada makes it perhaps the most pristine area remaining along the escarpment.

APPENDIX B:
CITY OF ALBUQUERQUE PLANNING DOCUMENTS

All of the plans listed below are briefly discussed in the Northwest Mesa Escarpment Plan.

Adopted Plans and Completed Studies

Albuquerque/Bernalillo County Comprehensive Plan, 1975 (under revision) includes Plan for Major Open Space

Northwest Mesa Area Plan, 1981 (under revision)

Facility Plan for Arroyos, 1985

Far Northwest Drainage Management Plan, 1986

Long Range Major Street Plan for the Albuquerque Urban Area, 1986

Facility Plan: Electric Service Transmission and Subtransmission Facilities (1985–1995), 1985

Lava Shadows Sector Development Plan, 1984

Riverview Sector Development Plan

Master Plan for Volcano Park, 1980

Reports of the Albuquerque/Bernalillo County Archeological Resource Planning Advisory Committee, 1986

Northwest Mesa Escarpment Plan, 1987

Plans in Progress

Revisions of Comprehensive Plan and Northwest Mesa Area Plan

Piedras Marcadas Arroyo Corridor Plan

San Antonio Arroyo Corridor Plan

Northwest Mesa Drainage Management Plan

Unser Boulevard Alignment Study

El Rancho Atrisco Phase V Sector Development Plan

Volcano Cliffs Sector Development Plan

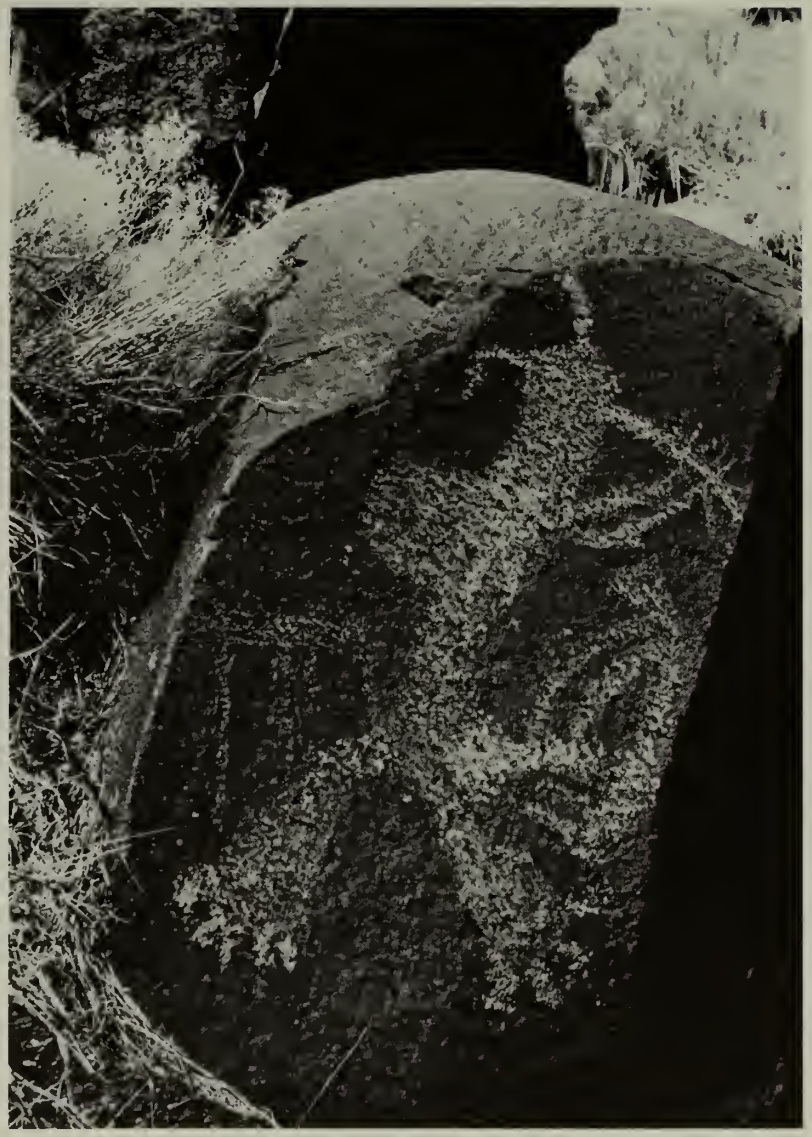
Archeological planning for the City of Albuquerque and County of Bernalillo--follow-up to earlier reports

APPENDIX C: THE STUDY TEAM

National Park Service

- Douglas D. Faris, Project Coordinator, Chief, Division of Planning and Design, Southwest Region
- Joan Mitchell, Park Planner, Division of Planning and Design, Southwest Region
- Bruce Anderson, Archeologist, Branch of Cultural Research, Southwest Region
- Art Ireland, Archeologist, Branch of Cultural Research, Southwest Region
- Dan Murphy, Interpretive Specialist, Division of Interpretation and Visitor Services, Southwest Region
- Allen Hagood, Planner/Natural Resource Specialist, Denver Service Center
- Joyce Fox, Visual Information Specialist, Division of Planning and Design, Southwest Region
- Nick DiCroce, Cartographic Technician, Division of Land Resources, Southwest Region
- Ken Kasper, Review Appraiser, Division of Land Resources, Southwest Region
- Jim Ellis, Soils Technician, National Park Service, Denver Service Center
- John Austin, Economist, National Park Service, Denver Service Center
- Frances McCalmont, Secretary, Division of Planning and Design, Southwest Region
- JoAnne Herrera, Production Assistant, Division of Planning and Design, Southwest Region

Bullet scars mar this petroglyph association. The plain, circular mask is on the rock's very edge, indicating perhaps the spirit being's all-seeing or seeing-both-ways powers.



A humpbacked figure of the fluteplayer, Kokopelli, Pueblo god of the earth's reproductive mysteries. Kokopelli goes back perhaps 2000 years in Anasazi rock art. The figure on the end of his phallus may be a kokopelli mana, or female consort of the god. The very large feet are unusual.

State of New Mexico Consultants

- James O'Hara, Archeologist, Historic Preservation Office
- Robert Findling, Director of Planning, New Mexico State Parks, Department of Natural Resources

City of Albuquerque Consultants

- Barbara Baca, Open Space Division, Parks and Recreation Department
- Rex Funk, Superintendent, Open Space Division
- Anne McLaughlin, City Planner, Planning Department
- John Messier, City Planner, Planning Department
- Jean Witherspoon, Associate Planner, Public Works Department
- James Merrill, Transportation Planner, Public Works Department
- Joe David Montano, Transportation Planner, Public Works Department
- Dwayne Sheppard, Hydrology/Special Projects Division Manager, Public Works Department

Technical Resource Experts/Consultants

- Polly Schaafsma, Archeologist, national expert on rock art, Santa Fe, New Mexico
- Ike Eastvold, Chairman, Friends of the Albuquerque Petroglyphs, expert on ethnographic aspects of West Mesa rock art, Albuquerque, New Mexico
- Matthew Schmader, Contract Archeologist, expert on West Mesa archeology, Albuquerque, New Mexico
- Phyllis Taylor, Planner, Southwest Land Research, Albuquerque, New Mexico
- Edith Cherry, Cherry-See Architects, Albuquerque, New Mexico

references

ALBUQUERQUE, CITY OF; PLANNING DEPARTMENT

1975 Albuquerque/Bernalillo County Comprehensive Plan: Plan for Major Open Space and Goals and Policies.

1985 Facility Plan for Arroyos.

1986 Long Range Major Street Plan.

1987 Draft Northwest Area Plan.

ALBUQUERQUE, CITY OF; PARKS AND RECREATION DEPARTMENT, OPEN SPACE DIVISION

1987 Draft Northwest Mesa Escarpment Plan, with City of Albuquerque Planning Department; Southwest Land Research, Inc.; Cherry-See Architects; and Open Space Task Force, West Mesa Committee.

ALBUQUERQUE, CITY OF; OPEN SPACE TASK FORCE, WEST MESA COMMITTEE

1980 Master Plan for Volcano Park.

HAGOOD, ALLEN R.

1987 "Natural Resources of the West Mesa Petroglyphs Study Area," Denver Service Center, National Park Service.

IRELAND, ARTHUR K.

1987 "The Cultural Resources of the West Mesa Petroglyph Study Area and Immediate Environs," Southwest Regional Office, National Park Service, Santa Fe, New Mexico.

MARSHALL, MICHAEL

1984 "The Mann Site LA290: A Tiquex Pueblo in the Middle Rio Grande District, New Mexico" (minor revision 1986), Cibola Research Associates.

1984 "National Register of Historic Places Inventory--Nomination Form" for the Mann Site LA290," prepared for and revised by Historic Preservation Division, Office of Cultural Affairs, State of New Mexico.

SCHAAFSMA, POLLY

1972 Rock Art In New Mexico, State Planning Office, State of New Mexico, Santa Fe, New Mexico.

1987 "Rock Art and Associated Archeological Sites of the Las Imagines Archeological District, West Mesa, Albuquerque: Statement of Significance," prepared for the Southwest Regional Office, National Park Service, Santa Fe, New Mexico.

SCHMADER, MATTHEW F. AND MARY C. STINER

1986 Archeological Resources of the Piedras Marcadas Arroyo Area, prepared for Municipal Development Division, Advanced Planning Department, City of Albuquerque, submitted by Rio Grande Consultants.

1987 "The Archeology of the West Mesa Area: A Summary," prepared for the Southwest Regional Office, National Park Service, Santa Fe, New Mexico.

SCHMADER, MATTHEW F. AND HAYS, JOHN D.

1986 Los Imagines: The Archeology of Albuquerque's West Mesa Escarpment with contributions by Anna M. Bacher, Charles M. Carrillo, Isaac C. Eastvold, and Mary C. Stiner, prepared for Open Space Division, Parks and Recreation Department, City of Albuquerque and the Historic Preservation Division, Office of Cultural Affairs, State of New Mexico

1986 "National Register of Historic Places Inventory--Nomination Form for Los Images Archeological District," prepared for and revised by Historic Preservation Division, Office of Cultural Affairs, State of New Mexico.

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